DOCUMENT RESUME

ED 255 467 SO 016 404

AUTHOR Lockheed, Marlaine E.; Harris, Abigail M.
TITLE A Study of Sex Equity in Classroom Interaction. Final Report: Volume I.
INSTITUTION Educational Testing Service, Princeton, N.J. Education Policy Research Institute.
SPONS AGENCY National Inst. of Education (ED), Washington, DC.
PUB DATE 31 Mar 84
CONTRACT 400-80-0032
NOTE 97p.; For Volume II, see SO 016 405.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS *Classroom Environment; Classroom Observation Techniques; Educational Research; Elementary Secondary Education; *Equal Education; Interaction Process Analysis; *Intergroup Relations; Intervention; Sex Differences; *Sex Fairness; Student Behavior; Tables (Data); Teacher Behavior

ABSTRACT

The first volume of a two-volume report on the study of sex equity in classroom interaction presents findings of previous studies of classroom interaction, methods used in the study, observations of classroom interactions, possible causes of sex segregation, sex differences in classroom leadership, and intervention implementation effects. The final chapter presents a summary of results. The two-year study (1980-82) involved 38 fourth- and fifth-grade classrooms in two districts in California and Connecticut. A total of 356 boys and 359 girls served as target students during the first year and 132 boys and 139 girls served as target students during the second year. Over 8,500 student hours of observation were augmented by in-depth interviews with teachers who participated in the study. In addition, an APPLE observation system was used as the study's major tool for observing and preserving classroom processes for analysis. Data from the study do not support the notion that classroom teachers play a major role in creating and maintaining inequities. Despite findings that boys are more disruptive (and thus receive more teacher attention), data suggest that teachers respond to the nature of the student behavior rather than to student gender. Findings concerning peer interaction showed that despite an overwhelmingly strong same-sex preference on the part of both girls and boys, students actually engaged in cross-sex interaction quite frequently and with no observable consistent differences from same-sex interaction. (LH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

ED255467

A STUDY OF SEX EQUITY IN CLASSROOM INTERACTION

FINAL REPORT

VOLUME I

Submitted to
National Institute of Education
U.S. Department of Education
Washington, DC 20202

March 31, 1984

Marlaine E. Lockheed, Project Director

Abigail M. Harris, Associate Project Director

Division of Education Policy Research & Services

SP 016 104

EDUCATIONAL TESTING SERVICE
PRINCETON, NJ 08541

Preparation of this report was supported in part by the National Institute of Education (Contract #NIE 400-80-0032) and by Educational Testing Service. Opinions expressed herein are not necessarily shared by NIE or ETS and do not represent the position of either organization.

Acknowledgements

It is with tremendous gratitude that I acknowledge the contribution of the 29 teachers in Montevista and Northern who so graciously allowed us to study their classrooms for two years. Without them, this report could never have been written.

I am indebted to the National Institute of Education and to Educational Testing Service for their financial support of this project, and to the principals and superintendents of Montevista and Northern for their adminsitrative support.

Those who worked on the project deserve special recognition. Abigail Harris, who served as Associate Project Director while engaged in doctoral studies at the University of California at Berkeley, was a true partner in the design and implementation of the study--including the intervention--and assumed major responsibility for the processing of the observation data. She served as the regional coordinator for Montevista, implementing all phases of data collection at that site. Karen Jensen served as regional coordinator for Northern, and was responsible for all data collection at that site as well as for maintaining records for all the raw data gathered over the two years at both sites. Marianne Amarel developed the interview protocols used in the study, trained us as interviewers, and analyzed the interviews that were conducted during Year 1. William Nemceff and Alfred Rogers established the numerous and complex data files and carried out many of the preliminary analyses. Leta Davis carried out many data collection activities.

We were fortunate to have three graduate student interns that worked on various phases of the project: Kendyll Stansbury of Stanford University, who documented all the Year 1 data; Kenneth Rosenblad of Teachers College; and Naomi Rutenberg of Princeton University, who carried out the analyses reported in Volume I of this report.

We received generous help from colleagues. Maureen Hallinan and Gaea Leinhardt suggested methods for gathering the sociometric data. Carolyn Hartsough trained the observers in the use of the APPLE observation system. Paul Holland and Samuel Leinhardt contributed to our understanding of social networks and methodologies for analyzing them. Frederick McDonald suggested using the APPLE system. Susan Klein and Barbara Richardson of NIE were supportive throughout.

The numerous drafts of this document were competently prepared by Thelma Benton. Elaine Guennel and Elizabeth Springsteen served as project secretary. The errors that remain are my own.

Marlaine E. Lockheed
Princeton, New Jersey
March 31, 1984

Table of Contents

		Page
Chapter One:	Sex Equity in Classroom Interaction	1-1
1.A.	What are Sex Inequities	1-1
1.A.1.	Sex segregation	1-1
1.A.1.a.	Observed work group of seating composition	1-2
1.A.1.b.	Observed interactions	1-2
1.A.1.c.	Self-reported preferences	1-3
1.A.1.d.	Sociometric ratings	1-3
1.A.2.	Male influence	1-4
1.A.2.a.	Obtaining help	1-4
1.A.2.b.	Evaluating the performance of others	1-4
1.A.2.c.	Observed influence	1-4
1.A.2.d.	Perceived leadership	1-4
1.B.	How do Teachers Contribute to Sex Differences	1-5
1.B.1	High status evaluator	1-5
1.B.2.	Reinforcement	1-6
1.B.3.	Managing in the classroom	1-7
1.C.	Summary	1-7
Chapter Two:	The Context of the Study	2-1
2.A.	Overall Design	2-1
2.A.1.	Sites	2-1
2.A.2.	Sample	2-1
2.A.3.	Student sample	2-2
2.B.	Data Sources and Measures	2-4
2.C.	Interviews	2-5
Chapter Three:	Classroom Interactions	3-1
3.A.	Observing in Classrooms	3-1
3.B.	Student Behavior	3-1
3.B.1.	Sex differences in general behavior	3-1
3.B.2.	Sex differences in specific behaviors	3-3
3.B.3.	Sex differences in quality of behavior	3-3
3.C.	Antecedent Teacher Behavior	3-13
3.C.1.	Sex differences in types of antecedent teacher behavior	3-13
3.C.2	Antecedent teacher behavior within subject matter	3-13
3.D.	Teacher Responses	3-17
3.D.1.	Teacher instruction	3-23
3.D.2.	Teacher posititve responses	3-23
3.D.3.	Teacher neutral responses	3-23
3.D.4.	Teacher negative responses	3-24
3.D.5.	Teacher managing responses	3-24
3.D.6.	Other responses	3-24

Table of Contents (Continued)

3.D.7.	Teacher responses within subject matter	3-24
3.D.8.	Teacher responses to the quality of student behavior.	3-25
3.E.	Peer Interactions	3-25
3.E.1.	Antecedent peer behavior	3-25
3.E.2.	Other peer responses	3-28
3.F.	Summary	3-31
Chapter Four:	Possible Causes of Sex Segregation	4-1
4.A.	Introduction	4-1
4.B.	Opportunities for Interaction	4-1
4.C.	A Closer Look at Student Interactions	4-2
4.C.1.	Boys in same-sex versus cross-sex interaction	4-3
4.C.2.	Girls in same-sex versus cross-sex interaction	4-4
4.C.3.	Girls and boys in same-sex groups	4-4
4.C.4.	Girls and boys in mixed-sex groups	4-5
4.D.	Teacher Response to Student Interaction	4-5
4.D.1.	Extent of teacher response to interactions	4-6
4.D.2.	Extent of teacher response to type of interactions	4-6
4.D.3.	Type of teacher response to interactons	4-6
4.E.	Student Attitudes	4-7
4.D.1.	Gender sterotypes, general	4-7
4.D.2.	Attitudes toward cross-sex interaction	4-9
4.E.3.	Dispositon toward male and female classmates	4-9
4.F.	Summary	4-9
Chapter Five:	Leadership	5-1
5.A.	Introduction	5-1
5.B.	Leadership	5-1
5.B.1.	Observed leadership behavior	5-1
5.B.2.	Self-reported leadership	5-1
5.C.	Influence	5-2
5.C.1.	Mean influence	5-2
5.C.2.	Rank order of influence	5-3
5.C.3.	Perceived leader of group	5-3
5.D.	Summary	5-3
Chapter Six:	Intervention Implementation and Effects	6-1
6.A.	Intervention	6-1
6.A.1.	Year One	6-2
6.A.2.	Year Two	6-3
6.B.	Evidence of Implementation	6-5
6.B.1.	Leadership behavior	6-6
6.B.2.	Leadership self reports	6-6
6.B.3.	Group behavior	6-6
6.B.4.	Self reports of group experiences	6-7

Table of Contents (Continued)

6.B.5. Summary of intervention implementation 6-7
6.C. Classroom Level Analysis 6-7
6.C.1. Sex segregation 6-8
6.C.2. Cross-sex interaction 6-11
6.C.3. Influence 6-13
6.C.4. Other intervention effects 6-15
6.C.5. Summary of classroom level analysis 6-17

Chapter Seven: Sex Equity in Classroom Interaction: Summary . . . 7-1

Appendix A. List of Project Publications and Presentations

Chapter One

Sex Equity in Classroom Interaction

1.A. What are Sex Inequities?

School classrooms are mini-societies (Jackson, 1968; Goodlad, 1984) that, while self-contained, replicate the larger society (Bourdieu & Passeron, 1977). The reproduction of social structures in school is particularly evident in the correspondence between gender segregation and male pre-eminance in the labor force (Kahne & Kohen, 1975; Baron & Bielby, 1983) and these same patterns in the public schools (Lockheed, 1984; Pottker & Fishel, 1977). In coeducational classrooms, boys and girls segregate themselves into two separate social structures (Hallinan & Tuma, 1978) and when boys and girls interact with one another, the boys are or are perceived to be more influential over the outcomes of the interaction than the girls (Lockheed, 1984). Such patterns significantly restrict the opportunities for students to learn from one another in ordinary classroom interaction.

The reasons for sex segregation and greater male influence are not well understood. Several explanations have been given for these observed phenomena. To explain sex segregation it has been suggested that: (1) Teachers encourage or reinforce sex segregation by their own interaction with students and by their organization of the classroom, (2) Children sex segregate themselves because of gender stereotypes, (3) Children encourage or reinforce sex segregation by negatively reinforcing cross-sex interactions. To explain male pre-eminance it has been suggested that: (1) Boys are more influential because of generally held beliefs about their greater task competence and that these beliefs are engendered by teacher behavior, (2) Boys are perceived to be more influential because of an unconscious association between males and leadership, an association which may also be contributed to by teacher behavior, (3) Boys are more influential because they perceive themselves to be better leaders or better problem solvers. Moreover, the teacher may be an important source of both stereotypes and beliefs about the greater competence of males, and the teacher's communication of his or her own beliefs through interaction with students may come to influence both student expectations and performance. In this chapter, we review the evidence regarding sex segregation and greater male influence in classrooms, and touch on the explanations for these patterns.

1.A.1. Sex segregation

In the decade since the implementation of Title IX of the Elementary and Secondary Education Act, administrators and teachers have expended considerable energy in an effort to eliminate overt sexism in the policies, programs, practices and materials of the public schools. While great strides have been made in opening programs to both girls and boys, in promoting gender-fair textbooks and other educational

materials, and in raising the consciousness of teachers and administrators regarding subtle inequities, a more fundamental form of sexism--one that threatens to undermine these positive gains--has remained untouched and unchanged: the universal tendency of children to segregate themselves on the basis of sex for virtually all social and academic activities.

Self-selected sex segregation is well documented as a widespread phenomenon among elementary and junior high school-aged children. It has been demonstrated in studies of student friendship choices and work partner preferences that utilize sociometric techniques in surveys of student attitudes, and by direct observation of student seating, play and interactive behaviors. The results of these studies show that students identify same-sex classmates as friends, choose to work with same-sex but not with cross-sex classmates, sit or work in same-sex but not cross-sex groups, and engage in many more same-sex than cross-sex verbal interchanges.

1.A.1.a. Observed work group or seating composition. Five recent studies of students in classrooms from preschool through junior high school have examined the likelihood of students to work or sit together in cross-sex groups. None of the studies reported much cross-sex contact. Marquis and Cooper (1982) observed students in two preschool classes who were selecting a partner for a self-disciplined work session; they reported that, over six separate observation occasions, there was virtual sex segregation in all of these choices, even though there was considerable variability across the sessions for within-sex partner choices. In a study of four first-grade reading groups, Wilkinson and Subkoviak (1982) report that the students showed a strong preference for sitting next to students of their own sex. In eleven classrooms of various elementary school grades, Campbell (1980) found that 78% of the students, when voluntarily forming groups, joined same-sex groups. Finally, Schofield and Sagar (1977) found that the seating patterns at 32 tables in a cafeteria were highly sex segregated; using "adjacencies" as their measure of cross-sex contact, they found that cross-sex adjacencies were rarely found among 7th- and 8th-grade students at lunch.

1.A.1.b. Observed interactions. Studies of observed interactions between students in classrooms confirm the findings of the studies of seating preferences; very little cross-sex interaction occurs in elementary classrooms or preschools. Berk and Lewis (1977) observed students in four different preschools and recorded social contacts and interchanges. They report that not only did the proportion of same-sex and cross-sex interchanges favor same-sex interchanges four to one, but that girls engaged in more same-sex interchanges than did boys. In another nursery school setting, Fagot (1977) reported that boys who showed cross-gender preferences were given more peer criticism and fewer positive reactions than boys who maintained same-sex preferences, but that this pattern was not the same for girls who showed cross-gender preferences. Serbin and her colleagues (Serbin, Tolnick & Sternglanz, 1977) found that in two nursery school classrooms they observed as part

of an experiment, cross-sex cooperative play was rarely observed during the baseline period of their observation. This finding was also reported in a study of 30 students, 8 to 10 years old, who were enrolled in a university laboratory school (Damico, 1975). Damico's observations recorded no incidence of spontaneous cross-sex academic helping behavior; rather, two separate sex-segregated social systems were identified. In a somewhat later study, Grant (1982) found fewer actual cross-sex interactions than would have been expected in six first-grade classrooms under observation. Moreover, although cross-sex helping was rare, when helping occurred it was more frequently girls helping boys than boys helping girls. In a slightly older age group, Singleton and Asher (1979) noted that 78% of the peer interaction they observed in third grade classrooms was same-sex interaction. In 11 six-person, cross-race, cross-sex groups from several elementary classrooms, Campbell (1980) found that 63% of all interactions were same-sex interactions, and that a higher proportion of cross-sex interactions could be characterized as negative.

1.A.1.c. Self-reported preferences. In one study of approximately 1,000 fourth- and fifth-grade students, Lockheed and her colleagues (Lockheed, Finkelstein & Harris, 1979) found that students overwhelmingly preferred to work with same-sex classmates. Over two-thirds of the students indicated that, if given a choice, they would prefer to work with three other students of their own sex than to work with three students, one or more of whom was not of their own sex. Same-sex preferences were stronger for the boys and for the fourth graders.

1.A.1.d. Sociometric ratings. The most comprehensive studies of sex segregation have been conducted using sociometric roster rating instruments. In these studies, students are requested to rate each other student in their classroom in terms of criterion, such as being a best friend, a friend, or not a friend. The results of these studies show consistent patterns of friendship cliques by sex and more positive same-sex than cross-sex ratings. In a study of third-grade students, Singleton and Asher (1977) found that same-sex play partner and same-sex work partner ratings were more positive than cross-sex ratings. Similar results were found by Hallinan (1977) in her study of 51 classes, grades five to eight; a total separation by sex existed in the cliques in every class. In a second study of 18 classrooms in grades four through six, Hallinan and Tuma (1978) found that 77% of the students' best friends were of their own sex. Hansell (1982) more recently reported the same result in eleven classrooms of junior high school students; same-sex sociometric ratings were much more positive than cross-sex ratings.

1.A.2. Male influence

Although adult men and women appear to work cooperatively together, there is considerable research evidence that they do not interact equally. Following a review of research on mixed-sex discussion groups, Lockheed and Hall (1976) drew three generalizations about behavior in these groups:

1. Men are more verbally active than women; that is the average man initiates more verbal acts than the average woman.

2. Men are more influential than women; a women is more likely to yield to a man's opinion than vice versa.

3. Men initiate a higher proportion of their acts than women in task-oriented categories of behavior, whereas women initiate a higher proportion of their acts in social-emotional categories.

These generalizations are consistent with the findings of a recent meta-analysis of research on the dynamics of mixed-sex task groups which concluded that, in general, males assumed the leadership positions in these groups (Lockheed, in press); this was particularly true when the task was stereotypically male. Studies of sex differences in influence in non-task settings, however, do not support these conclusions (Eagly & Carli, 1981). The exercise of influence in task settings includes obtaining help, evaluating the performance of others, determining group consensus, and being perceived as the leader of the group.

1.A.2.a. Obtaining help. In Raviv's (1982) study of 18 mixed-sex groups of 7th grade students engaged in a Lego construction task, she found that boys received more verbal and nonverbal cooperation from girls than girls received from boys. Similarily, Webb (1982) found that in groups of high school students working together on a unit dealing with exponents and scientific notation, girls were more likely to respond to boys' requests for help than were boys likely to respond to girls request for help.

1.A.2.b. Evaluating the performance of others. Evaluating the performance of others is a powerful way of exerting influence (Webster & Driscoll, 1978). The evidence regarding sex differences in giving performance evaluations is mixed, however. Some researchers have found that boys give more negative evaluations to girls than girls give to boys. This was reported, for example, by Wilkinson and Subkoviak (1982), who studied sociolinguistic phenomena in mixed-sex reading groups and found boys criticized girls much more than girls criticized boys. Best (1983) confirmed this finding in her longitudinal study of one classroom from first grade through high school; in the early years, boys criticized girls more than girls criticized boys, but the pattern changed over time. Lockheed studied cross-sex interaction in small groups working on a gender-neutral board game. In groups composed of strangers, she found no sex differences in either the receiving or giving of positive or negative evaluations (Lockheed, Harris & Nemceff, 1983). In groups composed of students from ongoing classrooms, however, she found that boys initiated more positive evaluations than girls did (Lockheed, in progress), but no sex differences in the initiation of negative evaluations were observed.

1.A.2.c. Observed influence. Obtaining help and evaluating the performance of others are merely two ways in which influence is exercised. The measurement of influence directly provides a clearer

indicator for evaluating sex differences in influence. Lockheed's study of mixed-sex groups from ongoing classrooms (Lockheed, Finkelstein & Harris, 1979) found that boys exercised significantly more influence than the girls over the group decision. They were more influential verbally and exercised influence nonverbally through physically controlling the game board. Similarly, Wilkinson, Chiang & Lindlow (in press) found that boys in six second- and third-grade mathematics groups were more likely to have their answer prevail than were the girls in these groups. In groups composed of strangers, boys and girls were equally influential (Lockheed, Harris & Nemceff, 1983). Similarly, Riordan's experiment with 5th-grade students found no sex differences in influence in two-person, mixed-sex bogus "teams" (Riordan, 1983). Teams were shown a pattern and were asked to make a judgment about the pattern; information about the "partner's" decision was controlled by the experimenter such that each subject was led to believe that his or her decision differed from the partners in a majority of cases. Influence was operationalized as the number of times the subject elected to stay with his or her decision instead of changing to the decision of the partner. No sex differences were observed for 28 fifth-grade subjects in the non-treatment condition.

1.A.2.d. Perceived leadership. Perceived leadership is not a behavior; it can be influenced by behaviors or by cultural factors that are not connected with behavior. Sex differences in perceived leadership abound, insofar as "leadership" is perceived of as a male characteristic (Broverman, Vogel, Broverman, Clarkson & Rosenkrantz, 1972). Rarely do studies examine both perceived leadership and actual influence simultaneously. In the Lockheed studies cited previously, however, data on both actual and perceived leadership were obtained. In the groups from ongoing classrooms, boys were three times as likely to be perceived as the group's leader as were girls. In groups of strangers, boys were twice as likely to be perceived as the group leader.

1.B. How Do Teachers Contribute to Sex Differences?

The teacher in the classroom holds multiple roles, among which are those of high status evaluator, reinforcer, and manager. These three roles have particular salience vis-a-vis sex segregation and male preeminance.

1.B.1. High status evaluator

One important source of children's self concepts has been shown to be the teacher (Webster & Entwistle, 1974). By providing task-specific feedback to children about the quality of their work, teachers can change children's self-expectations about their general competence; this is most effective in public settings, where peers also hear these evaluations. Positive evaluations give rise to positive self concept and negative evaluations to negative self concept. Children holding relatively more positive task-related self concepts are more likely to participate in and be influential over the task than are children with less positive task related self-concepts.

If the teacher regularly and publicly provides positive task oriented feedback more frequently to boys than to girls, it is possible that the boys will develop more positive task-related self concepts and girls less positive ones and that boys will ultimately be more influential than girls at mixed-sex tasks. Evidence regarding whether teachers do, in fact, provide more positive evaluations for boys engaged in task behavior is fairly limited; many studies have looked simply at overall praise or criticism received (see Brophy, 1981 and 1984, for reviews). The findings of several early studies are quite inconclusive, with some reporting more criticism directed at boys (Etaugh & Harlow, 1975; Meyer & Lindstrom, 1969; Meyer & Thompson, 1956; Spaulding, 1963), some reporting more praise directed at boys (Delefes & Jackson, 1972; Etaugh & Harlow, 1975; Spaulding, 1963) and others reporting no difference in praise (Meyer & Lindstrom, 1969; Meyer & Thompson, 1956) or in criticism (Delefes & Jackson, 1972). These studies are generally unable to inform hypotheses regard the effects of positive performance evaluation on self concept formation, however, for the simple reason that they did not identify the performance, if any, that was evaluated.

Several more recent studies appear to substantiate the claim that boys receive more positive evaluation for task performance than do girls. In general, however, the sample sizes of these studies have been small. For example, Brophy and Good (1970) report that the 24 boys in their four-classroom sample received more praise for correct answers than the 24 girls in the sample received. Delefes and Jackson (1972) report that praise received by girls occurred randomly while boys were praised for participation in academic activities. Dweck and her colleagues reported that girls in two classrooms received more negative feedback for the intellectual quality of their work than did boys (Dweck, Davidson, Nelson & Enna, 1978). In studies conducted with larger samples, for example, Eccles and Blumenthal (personal communication), sex differences in received performance evaluations are not evident. More importantly, they apparently do not emerge in public (as opposed to private) classroom settings (Brophy, Evertson, Anderson, Baum & Crawford, 1981), and hence are less likely to affect the development of performance expectations for self versus others, which are critical to leadership emergence in task settings.

Sex differences in task-specific performance expectations may also be developed by teachers by their behavior with students. For example, data analyzed by Leinhardt, Seewald and Engel (1979) suggest that girls develop positive performance expectations in reading and boys develop positive performance in mathematics because teachers make relatively more academic contacts with girls in reading and boys in math.

1.B.2. Reinforcement

Teachers may also serve to promote sex segregation and male dominance by their reinforcement behavior. For example, Serbin, Tonick and Sternglanz (1977) demonstrated that teachers could increase the amount of cooperative cross-sex interaction in their classroom by praising such behavior. Similarly, male dominance may be reinforced by

teachers positively evaluating boys for calling out and volunteering. We are unaware of any research other than our own that bears on this issue.

1.B.3. Managing the classroom

Classroom management has important effects on sex segregation and on male leadership. If the teacher provides opportunities for greater cross-sex interaction through the use of small, mixed-sex groups, then greater cross-sex interaction is likely to occur. Evidence for this is provided in several studies. DeVries and Edwards (1973, 1974) found that students assigned to work together in cross-sex teams with team rewards exhibited more cross-sex helping behaviors than students working for individual rewards. Raviv (1982) found that students from classrooms that utilized a method of group problem solving for academic tasks (Sharan & Hertz-Lazarowitz, 1979) were more likely to exhibit more cross-sex cooperation at a joint task than students from regular "whole class" instruction classes. Learning centers provide such opportunities for group interaction; Cohen and Anthony (1982) observed students working at learning centers and found no sex-related differences in either talking or working together. If teachers manage their classroom to include small-group cross-sex learning environments, sex segregation may be reduced.

Student leadership in the elementary classroom includes formal leadership roles such as class president or team captain, student helping roles such as ball monitor or flag captain, "star" roles such as announcer at an assembly or lead in a student play, instructional roles such as peer tutor or project leader, as well as a variety of roles enabling the student to demonstrate competence. These roles are frequently assigned by the teacher. There is evidence that students who enagage in relatively more student leadership roles have higher self esteem and greater sense of efficacy (Lockheed, Finkelstein & Harris, 1979) and that peer tutors have higher achievement (Allen, 1976). If teachers assign leadership positions equally to boys and girls, then boys are not as likely to be more preeminant in the classroom than girls.

1.C. Summary

In this chapter we have demonstrated that sex segregation and male preeminance are problems characteristic of many classrooms, and have explored how teacher instructional practices may promote sex segregation and male preeminance.

Chapter Two

The Context of the Study

2.A. Overall Design

The planned design for this study was a two-year replication in which half the participating teachers would be randomly selected for treatment during the first year while the other half would remain as controls. During the second year, the control group would also receive the treatment. Both economic and school-related factors affected our ability to carry out the planned design in its entirety. In the remainder of this chapter we will describe the design as it was implemented.

2.A.1. Sites

Two school districts participated in this study: Montevista (not the real name) in the San Francisco Bay area in California, and Northern (not the real name) in Connecticut. Although a continent apart, Montevista and Northern shared many characteristics. Both were ethnically diverse, contained large working class populations and were experiencing declining enrollments. In 1979, the medium income of Montevista was $24,950 and the medium income of Northern was $26,757. Northern was an older district than Montevista, and was larger; in 1980, 11,805 students in grades K-12 were enrolled in 15 elementary and 7 secondary schools in Northern and 7,800 students in grades K-12 were enrolled in 10 elementary and 4 secondary schools in Montevista. Teachers in both districts were highly experienced.

2.A.2. Sample

For the 1980-81 academic year, 29 fourth- and fifth-grade volunteer teachers were recruited, 15 from three schools in Northern and 14 from six schools in Montevista. Of these, five teachers in Northern and eight teachers in Montevista were available to participate in the treatment and were designated "Experimental" teachers. Between 1980-81 and 1981-82, eleven teachers left the study, primarily due to grade reassignments, illness or leaving the district; only three eligible teachers declined to participate further. In 1981-82 eight teachers in Northern and ten teachers in Montevista remained in the sample. A summary of the sample appears in Table 2.1.

The 29 original volunteers were experienced teachers; on the average, they had been teaching 18.6 years, and 87% had been teaching the grade level they were now teaching for four or more years. The majority of teachers in Montevista taught single-grade, self-contained classrooms. In Northern, however, both reading and mathematics instruction were provided to students who were homogeneously grouped according to their achievement in the subject matter. That is, students

Table 2.1

Number of Participating Teachers,
by Year, Grade Level, Site and Condition

Site and Condition	1980-81			1981-82		
	4	4-5	5	4	4-5	5
Montevista						
Control	3	1	2	3	0	1
Experimental	5	1	2	4	1	1
Northern						
Control	3	0	7	2	0	2
Experimental	3	0	2	3	0	1
Total	14	2	13	12	1	5

in a given homeroom were separated from their classmates and grouped with students from other homerooms within the school for reading instruction according to their reading achievement, and regrouped according to their mathematics achievement for their mathematics instruction. Moreover, several of the teachers in Northern "team taught" science and social studies so that, although the homeroom remained intact, one teacher taught science to two classes while his or her team teacher taught the same two classes social studies. In Northern, therefore, it was not reasonable to treat one teacher in a school and leave a second matched teacher as a control, as the treatment effect would be felt only slightly by the students in the treated teachers' homeroom and would be diluted by extensive exposure to untreated teachers. Finally, in Northern, the elementary schools contained grades K-5 while in Montevista the elementary schools contained grades K-7; we were forced to select teachers of grades four and five, therefore, instead of grades four and six, which our intial design had called for.

2.A.3. Student sample

The students included in this study were the homeroom students of the participating teachers. In some cases, these students remained with the teacher all day, in other cases the students' instruction was provided by a team of teachers. Every effort was made to include all members of a team in the study. Only students who were enrolled at both the beginning and the end of the academic year were included in the study. The characteristics of the student participants are summarized in Table 2.2. These descriptions were provided by the homeroom teacher.

The sample included more fourth-grade than fifth-grade students, slightly more boys than girls, substantial ethnic diversity, and a high

Table 2.2

Summary of Student Characteristics by Site

Characteristics	Montevista 1980-81 %	Montevista 1981-82 %	Northern 1980-81 %	Northern 1981-82 %
Grade				
4th	66.2	76.9	44.2	56.6
5th	33.8	23.1	55.8	43.4
Sex				
Boys	52.9	50.0	49.6	47.4
Girls	47.1	50.0	50.4	52.6
Racial or Ethnic group				
American Indian or Alaskan Native	0.9	0.4	0.0	0.0
Black or Afro-American or Negro	11.8	8.3	24.5	25.0
Mexican-American or Chicano	16.6	15.7	0.3	0.0
Oriental or Asian-American or Pacific Islander	14.8	16.5	1.2	0.7
Puerto Rican	1.2	0.4	1.5	2.6
White or Caucasian	53.8	52.9	71.3	69.1
Other	0.6	5.4	1.2	2.7
Handicapped				
Educationally (As per P.L. 94-142)	6.3	9.1	11.0	27.0
Emotionally	0.0	2.9	0.0	4.6
Physically	0.3	0.4	1.5	2.0
Language				
Monolingual English	80.7	80.6	91.9	88.8
Bilingual English	18.1	17.8	6.3	11.2
Lunch Subsidy				
Partial	16.6	5.8	22.1	7.2
Total	10.9	12.0	7.8	21.1
None	62.8	62.8	66.6	71.7

proportion of students receiving partial or total lunch subsidy. Higher proportions of students in Montevista were Mexican-American or Asian than in Northern, while more Northern students were black; over 10% of the students were bilingual. The student participants reflected the working class communities in which the districts were located.

2.B. Data Sources and Measures

The unit of analysis for this study was the classroom; individual data were gathered, but we generally aggregated these data at the classroom (homeroom) level. Measures of dependent variables were collected at the beginning and the end of each study year, and observations were made between pretest and posttest. Thus, there was an express temporal ordering of the data, and this ordering has been preserved in the analyses wherever applicable. Several types of measures have been included; these are described fully in subsequent chapters and in Volume II of this report. In this chapter, we will summarize them, as follows:

1. Demographic information, available for all students in both study years, were: grade, sex, ethnicity, language ability, economic status as indicated by participation in lunch subsidy program, physical handicap, educational handicap.

2. Student perceptions of the relative academic competence of boys and girls in their classrooms (STUCOMP), gender stereotypes (STEREO), attitudes toward cross-sex interaction (ATTCSI) attitudes towards boys and girls as leaders (ATTLEAD).

3. Student evaluation of their own leadership abilities (SLFLEAD) and their own ability as a problem solver (PROBSOL).

4. Student self report of leadership experiences (LEADEXP) and cross-sex interaction experiences (COOPEXP).

5. Sociometric structure of each classroom as computed from classroom rosters completed by both students (1980-81 and 1981-82) and teachers (1980-81 only).

6. Leadership structure of small groups as indicated by a measure of individual influence over the group decision.

7. General classroom environment, including the subject matter being taught and what the teacher was doing (TEACHER ACTIVITY).

8. The environment of the target student, including the specific content of the target student's instructional or classroom program (PUPIL ACTIVITY), who was in charge of the instruction, to what extent was the target pupil working in the same subject matter as the rest of the class, to what extent were the assignments individualized within the subject matter, and what was the working relationship of the target pupil to others in the class.

9. Observed student behavior (EVENT), which was an anecdotal record of an observable behavior of the target pupil, including both activity and inactivity.

10. Quality of pupil behavior with respect to the academic/nonacademic expectations of the typical classroom. (A "plus" was assigned to behaviors that were associated with appropriate, productive classroom behavior; a "minus" was assigned to inappropriate behavior; and a "zero" rating indicated that the quality of the behavior was neutral or indeterminate with respect to the requirements of the classroom at the moment of the event.)

11. Antecedent peer behavior (APB) or antecedent teacher behavior (ATB) which was behavior that precipitated the target student's behavior.

12. Teacher (TR) and other student response (OPR) to the target pupil behavior.

2.C. Interviews

Given that gender related behaviors and perceptions are pervasive and deeply ingrained in the culture, the effects of the interventions planned for the study were expected to fall short of creating equal gender status in the classroom. A major goal of the research, however, was to gain a clearer understanding of the processes and practices that create, reinforce, and maintain inequity in classroom interactions; the intervention was thus viewed as an occasion to make some of these processes overt, visible, and accessible to analysis.

The study's major tool for obtaining and preserving classroom processes for analysis was the APPLE observation system. The classroom observations were augmented by in-depth interviews with the teachers who participated in the intervention.

Three interviews were conducted over the course of the study. The first occurred during the opening session of the CARE workshops in Year 1, the second at the end of the first school year, and the third at the end of the second year. The procedure was semi-structured, the interviewers guided by a sequenced set of open-ended questions that were drawn up in advance. The interviewers, however, who were the ETS staff responsible for managing the intervention, were guided more by the intent rather than the specific wording of the questions during the hour long sessions. The interviews were tape recorded, with the interviewers subsequently preparing written protocols of their conversations.

The initial interview had a dual purpose. It was a means to gain information about the background and the particular classroom environment of each teacher; this information was immediately incorporated into the workshops. The opportunities and constraints characterizing the teachers' working situation in part determined the intervention activities suggested to, and planned with the teachers during the work-

shop. The teachers' description of their own classrooms also provided a context for the more detailed, yet necessarily more fragmented APPLE observations, serving, at the same time, as a pre-intervention assessment of the quality and variety of classroom interactions. The contextual information was elicited during the first part of the interview.

The second part of the interview centered on gender related concerns. The teachers were asked to describe any differences they noted in the behaviors, attitudes, interests and capacities of boys and girls. Their views of the origins and modifiability of such differences were also sought, along with their perception of the nature of interactions between boys and girls in their class, and the origins and modifiability of these. The last part of the interview inquired into the teachers' responses and strategies to the gender differences they reported; the effects of gender considerations on their teaching plans, goals and practices. In summary, the interview was designed to elicit the teachers' awareness of gender related issues, the kinds and degree of differences they noted, the manner in which they construed them, and finally, how they thought about their own behavior in relation to these concerns.

The second and third interviews conducted focused on what had stayed with the teachers from the intervention and how they had changed their classrooms. The interviews were designed to identify specific changes in leadership and grouping strategies and to explore student responses to these differences.

Chapter Three

Classroom Interactions

3.A. Observing in Classrooms

Classroom observation procedures can be grouped into three major categories: (1) those that focus on the teacher, (2) those that focus on the teacher-student dyad, and (3) those that focus on the student. The observation method used in the present study was of the latter type. Eight times during Year 1 and six times during Year 2, different randomly selected target students (three boys and three girls per classroom) were observed for the academic portions of an entire school day. Over the two years of the study, more than 8500 student hours of observation were conducted. A total of 356 boys and 359 girls served as target students during the first year and 132 boys and 139 girls served as target students during the second year. The sample was heterogeneous as to ethnic background, family income and student achievement.

During the first year, 11,045 observations of girl target students and 12,520 observations of boy target students were made; during the second year, 2,534 observations of girl target students and 2,728 observations of boy target students were made. Observation records were subsequently and independently encoded by trained coders according to detailed lexicons developed for this purpose. Both interobserver reliabilities and intercoder reliabilities were high throughout the study (see Appendix A of this chapter for details). The coded observation records provided the data for the following analyses.

3.B. Student Behavior

Encoded student behaviors were grouped into nine general categories according to the APPLE Lexicon as described in Volume II of this report: (1) academic performance, (2) orientation to instruction, (3) interactions, (4) affective behavior, (5) personality traits and attitudes, (6) physical characteristics and activity, (7) health and illness, (8) family history and characteristics, and (9) administrative behaviors. A complete description of the behaviors that fall under each of these categories is contained in Volume II; in general, each category covers ten or more specific behaviors. In addition, each behavior was assigned a designation by the observer that indicated whether or not the behavior was appropriate or inappropriate for the classroom; if no judgment could be made or if a judgment was not applicable, the behavior was designated as "neutral."

3.B.1. Sex differences in general behavior

The frequency of behaviors observed under each of the general categories, by sex of target student and year of observation, is presented in Table 3.1. Sex differences were found for the relative frequency of behaviors in each of these categories for Year 1

Table 3.1

Frequency and Percent of Male and Female

Target Student Behaviors, by Category

Behavior Category	Year 1		Year 2	
	Boy[a]	Girl[b]	Boy[c]	Girl[d]
1. Ability & academic performance	808 (6.5%)	761 (6.9%)	134 (4.9%)	113 (4.5%)
2. Orientation to instruction	7917 (63.2)	7324 (66.3)	1916 (70.2)	1861 (73.4)
3. Interactions	1268 (10.1)	952 (8.6)	215 (7.9)	174 (6.9)
4. Affective Behavior	1830 (14.6)	1479 (13.4)	396 (14.5)	320 (12.6)
5. Personality Traits & Attitudes	328 (2.6)	234 (2.1)	13 (0.5)	15 (0.6)
6. Physical Characteristics and Activity	199 (1.6)	113 (1.0)	7 (0.3)	10 (0.4)
7. Health and Illness	15 (0.1)	11 (0.1)	1 (0.0)	1 (0.0)
8. Family History and Characteristics	2 (0.0)	1 (0.0)	0	0
9. Administrative-Other	153 (1.2)	170 (1.5)	46 (1.7)	40 (1.6)

Chi-square $_{ab}(8) = 55.86$, $p < .01$

Chi-square $_{cd}(8) = 8.92$, n.s.

(Chi-square (8) = 55.86, $p < .01$) but not for Year 2 (Chi-square (8) = 8.92, n.s.). Associated with each behavior was a designator that indicated whether--in the observer's judgment--the behavior was appropriate for the classroom, inappropriate for the classroom, or neutral; the majority of behaviors for both years were judged to be appropriate. In both years, a higher frequency of boy behavior (21.2% and 21.8% in Year 1 and Year 2, respectively) than girl behavior (14.7% and 15.8%) was judged to be inappropriate, and a higher frequency of girl behavior (54.8% and 59.1%) than boy behavior (46.3% and 53.5%) was judged to be appropriate. These differences were statistically significant (Chi-square (2) = 231.16, $p < .001$ for Year 1; Chi-square (2) = 33.02, $p < .001$ for Year 2).

3.B.2. Sex differences in specific behaviors

Coded behaviors included 18 ability and academic performance behaviors, 28 orientation to instruction behaviors, 26 interaction behaviors, 26 affective behaviors, 19 personality traits and attitudes, 18 physical characteristics and activity, and 32 behaviors under three categories of health and illness, family history and characteristics and administrative behaviors. When the observer's judgment regarding the appropriateness of the behavior was taken into account, 492 behaviors were available for analysis.

The average numbers of behaviors that were observed for boys and for girls in Year 1 and Year 2 are reported in Tables 3.2a and 3.2b. We see few differences in these averages, which range from zero to less than three per target student. Because of the relative infrequency of all specific behaviors, we selected those weighted behaviors having a combined (male plus female) average frequency greater that .05 per target pupil for gender comparisons. For these behaviors, a sex difference was operationalized as a mean occurrance of the behavior for one sex that was equal to or greater than 1.5 times the mean occurance of the behavior for the other sex; this we took to be a meaningful difference, regardless of its statistical significance. A total of 41 such behaviors were identified for Year 1 and 31 for Year 2. In Year 1, 39 of these behaviors occurred more frequently for boys and 2 more frequently for girls; in Year 2, 23 behaviors occurred more frequently for boys and 9 more frequently for girls (Table 3.3). Although for the majority of behaviors (87% in Year 1 and 90% in Year 2), no sex differences as defined were observed, the behaviors that did differentiate by sex accounted for approximately 14% and 2% of all female behaviors for Year 1 and Year 2 respectively, and for approximately 23% and 15% of all male behaviors for Year 1 and Year 2 respectively.

3.B.3. Sex differences in quality of behavior

In general, where more frequent boy behaviors were observed, these behaviors were labeled by the observers as "inappropriate" behaviors. In Year 1, 20 of the 41 (50%) behaviors that occurred more frequently for boys were labeled inappropriate, and one was labeled "appropriate;" by comparison, neither of the more frequently occurring behaviors for

Table 3.2a

Mean Student Behavior, by Appropriateness of Behavior and Sex of Student, Based on a Sample of 362 Girls and 356 Boys (Year 1)

Student Behavior	Quality of Behavior: Inappropriate Girls	Inappropriate Boys	Neutral Girls	Neutral Boys	Appropriate Girls	Appropriate Boys
Ability & Academic Performance						
Academic performance	0.20	0.24	0.21	0.25	1.33	1.45
Convergent production	-	-	0.01	0.01	0.07	0.06
Divergent production	-	-	-	-	0.03	0.03
Interests	-	-	0.01	-	0.02	0.01
Intellectual functioning	-	-	-	-	-	0.01
Listening comprehension	-	0.01	-	0.01	0.01	-
Number concepts	-	-	-	0.01	0.01	0.01
Oral reading	-	0.01	0.02	0.02	0.15	0.13
Phonic skill	-	-	0.01	0.01	-	-
Orientation to Instruction						
Attention span	0.01	0.05	0.01	0.02	-	0.02
Attentiveness	0.43	0.49	0.88	0.90	2.40	2.28
Calls on	-	0.01	0.01	0.01	0.05	0.02
Cheating	0.05	0.04	0.01	-	-	-
Copying	0.02	0.02	0.01	0.02	0.01	0.04
Direction following	0.09	0.18	0.20	0.36	1.02	1.10
Diversionary tactics	0.04	0.08	0.02	0.06	-	-
Egress	-	0.02	0.10	0.18	0.07	0.08
Engagement	0.16	0.35	0.51	0.58	2.98	2.71
Finished	-	0.01	0.12	0.07	0.19	0.25
No response	0.01	0.03	0.04	0.04	-	-
Prepare	0.01	0.03	0.27	0.21	0.17	0.18
Participation	0.10	0.20	0.31	0.38	1.79	1.65
Punctuality	-	0.01	-	-	-	-
Pupil Help	0.01	0.01	0.07	0.07	0.17	0.15
Pupil Request	0.01	0.01	0.10	0.13	0.14	0.12
Questioning	0.03	0.03	0.38	0.46	0.66	0.65
Score	-	-	-	-	0.01	-
Sitting behavior	0.15	0.24	0.14	0.26	0.01	0.01
Speaking	-	-	0.01	0.01	0.01	0.02
Talking	0.97	1.42	1.60	1.72	0.33	0.33
Volunteering	-	-	0.01	0.03	0.08	0.08
Waiting	-	-	0.12	0.17	0.18	0.25
Wandering	0.04	0.11	0.02	0.11	-	-
Withdrawal	0.02	0.05	0.04	0.08	-	-
Work Habits	0.11	0.23	0.40	0.55	2.27	2.25

Table 3.2a (Continued)

Mean Student Behavior, by Appropriateness of Behavior and Sex of Student, Based on Sample of 362 Girls and 356 Boys (Year 1)

Student Behavior	Quality of Behavior: Inappropriate Girls	Inappropriate Boys	Neutral Girls	Neutral Boys	Appropriate Girls	Appropriate Boys
Interactions						
Aggression	0.06	0.08	-	0.01	-	-
Argue	0.02	0.05	0.02	0.01	-	-
Attention getting	0.08	0.27	0.06	0.17	-	0.01
Borrows	-	-	0.03	0.03	0.02	0.01
Controlling	0.02	0.03	0.03	0.02	0.01	0.02
Competition	-	0.01	0.01	0.02	0.04	0.03
Cooperation	0.01	0.01	0.05	0.09	0.30	0.24
Disrupting conduct	0.09	0.37	0.01	0.05	-	-
Fighting	0.01	0.03	-	-	-	-
Laugh	0.10	0.25	0.12	0.20	0.03	0.03
Looks at	0.11	0.09	0.49	0.52	0.13	0.10
Meddling	0.06	0.07	0.02	0.03	-	-
Mimicking	0.01	0.03	-	0.01	-	-
Physical contact	0.03	0.03	0.04	0.03	0.01	0.01
Positive feedback	-	-	0.01	0.01	0.02	0.03
Pupil listening	0.01	0.01	0.08	0.06	0.05	0.05
Reassurance	-	-	0.03	0.03	0.03	0.03
Request	-	-	0.03	0.06	0.03	0.03
Social relationships	0.02	0.02	0.09	0.08	0.09	0.05
Tattling	0.01	0.02	0.03	0.01	-	-
Teasing	0.04	0.11	0.02	0.04	-	0.01
Affective Behavior						
Affect	0.10	0.10	0.22	0.22	0.33	0.38
Anger	0.02	0.02	0.02	0.03	-	-
Bizarre behavior	-	0.04	0.02	0.03	-	-
Complaining	0.01	0.02	0.06	0.06	0.01	0.01
Conduct	0.19	0.31	0.17	0.25	0.05	0.04
Crying	-	-	0.01	0.01	-	-
Enthusiasm	-	-	0.01	0.03	0.09	0.09
Making faces	0.09	0.13	0.03	0.03	0.01	-
Frustration	-	0.01	0.02	0.01	-	-
Giggling	0.04	0.06	0.05	0.04	0.01	0.01
Hurt feeling	-	-	0.01	-	-	-
Impertinence	0.04	0.06	-	0.01	-	-
Play	0.23	0.58	0.16	0.26	0.01	0.03

Table 3.2a (Continued)

Mean Student Behavior, by Appropriateness of Behavior and Sex of Student, Based on Sample of 362 Girls and 356 Boys (Year 1)

Student Behavior	Quality of Behavior: Inappropriate Girls	Inappropriate Boys	Neutral Girls	Neutral Boys	Appropriate Girls	Appropriate Boys
Affective Behavior (Continued)						
Responsiveness	0.05	0.11	0.17	0.26	0.32	0.39
Sharing	0.15	0.16	0.32	0.42	0.34	0.30
Stops behavior	-	-	0.06	0.10	0.08	0.06
Sulking	0.01	0.01	0.01	-	-	-
Whispering	0.26	0.24	0.23	0.16	0.04	0.01
Yelling	0.02	0.04	0.02	0.01	-	-
Personality Traits and Attitudes						
Anxiety	0.01	-	-	-	-	-
Defensiveness	0.01	-	-	-	-	-
Fear failure	-	-	0.01	0.01	-	-
Independence	-	-	-	0.01	0.01	-
Nervous habits	0.02	0.07	0.29	0.41	-	-
Personal need	0.01	0.01	0.16	0.22	0.06	0.06
Possessions	0.01	0.01	0.01	0.03	0.01	0.01
Responsibility	-	-	-	-	-	0.01
Self-concept	0.01	0.01	0.01	0.01	-	0.01
Shyness	-	-	0.01	0.01	-	-
Physical Characteristics and Activity						
Activity level	-	-	-	0.01	-	-
Attire	-	-	0.01	0.03	-	-
Fatigue	-	0.01	0.06	0.12	-	-
Handedness	-	-	0.01	0.02	0.01	0.01
Motor behavior	0.01	0.01	0.01	0.02	0.02	0.04
Physical appearance	-	-	0.01	0.01	0.01	-
Restlessness	0.02	0.04	0.07	0.11	0.01	-
Sleep behavior	-	-	-	0.01	-	-
Sucking behavior	-	0.01	0.06	0.09	-	-
Visual-motor organization	-	-	0.01	-	-	0.01
Health and Illness						
Attendance	-	0.01	-	-	-	-
Illness	-	-	-	0.01	-	-
Injury	-	-	0.01	0.01	-	-
Medical treatment	-	-	-	0.01	-	-
Physical complaint	-	-	0.01	-	-	0.01
Physical condition	-	-	0.01	-	-	-

Table 3.2a (Continued)

Mean Student Behavior, by Appropriateness of Behavior and Sex of Student, Based on Sample of 362 Girls and 356 Boys (Year 1)

Student Behavior	Quality of Behavior: Inappropriate Girls	Inappropriate Boys	Neutral Girls	Neutral Boys	Appropriate Girls	Appropriate Boys
Administrative-Other						
Aid teacher	-	-	0.03	0.02	0.29	0.20
Scheduling	-	0.01	0.05	0.10	0.10	0.11
Other	0.01	-	0.01	0.02	0.01	0.02

Table 3.2b

Mean Student Behavior, by Appropriateness of Behavior and Sex of Student, Based on a Sample of 139 Girls and 132 Boys (Year 2)

Student Behavior	Quality of Behavior					
	Inappropriate		Neutral		Appropriate	
	Girls	Boys	Girls	Boys	Girls	Boys
Ability & Academic Performance						
Academic performance	0.04	0.07	0.04	0.07	0.50	0.66
Convergent production	0.01	0.02	0.05	0.02	0.10	0.11
Divergent production	-	-	-	-	-	0.01
General knowledge	-	-	-	-	0.01	-
Interests	-	-	-	-	0.01	-
Intellectual functioning	0.01	-	0.01	-	-	0.01
Oral reading	0.01	0.01	0.01	-	0.02	0.05
Orientation to Instruction						
Attention span	0.01	0.03	-	0.01	-	0.01
Attentiveness	0.28	0.30	0.64	0.78	2.32	2.20
Calls on	-	0.01	-	-	-	-
Cheating	0.02	0.02	-	-	0.01	-
Copying	0.02	0.03	-	-	0.01	-
Direction following	0.07	0.04	0.07	0.08	0.48	0.42
Diversionary tactics	0.01	0.02	-	-	-	-
Egress	0.01	-	0.07	0.04	0.01	-
Engagement	0.04	0.08	0.37	0.39	2.62	2.67
Finished	0.01	-	0.01	0.02	-	0.02
No response	0.01	0.02	0.01	0.03	0.03	0.02
Prepare	0.01	0.03	0.17	0.17	0.12	0.11
Participation	0.08	0.15	0.33	0.38	1.17	1.49
Punctuality	0.01	-	-	0.01	0.01	0.02
Pupil Help	0.01	0.02	0.09	0.11	0.20	0.17
Pupil Request	0.01	0.02	0.04	0.11	0.06	0.07
Questioning	0.03	0.04	0.31	0.30	0.46	0.55
Sitting behavior	0.06	0.08	0.09	0.14	-	-
Talking	0.60	0.74	0.65	0.60	0.20	0.16
Volunteering	-	-	0.01	0.01	0.01	0.01
Waiting	-	-	0.02	0.02	0.17	0.14
Wandering	0.01	0.02	-	0.02	-	-
Work Habits	0.12	0.27	0.31	0.37	0.91	0.91

Table 3.2b (Continued)

Mean Student Behavior, by Appropriateness of Behavior and Sex of Student, Based on Sample of 139 Girls and 132 Boys (Year 2)

Student Behavior	Quality of Behavior: Inappropriate Girls	Inappropriate Boys	Neutral Girls	Neutral Boys	Appropriate Girls	Appropriate Boys
Interactions						
Aggression	0.03	0.06	-	-	-	-
Argue	0.03	0.02	-	0.01	-	-
Attention getting	-	0.04	-	0.01	-	-
Borrows	0.01	0.02	0.02	0.01	0.02	-
Controlling	0.01	-	0.01	-	-	-
Competition	-	-	0.01	0.01	0.01	0.01
Conformity	-	0.01	-	-	-	-
Cooperation	-	0.01	0.02	0.02	0.12	0.07
Disrupting conduct	0.15	0.38	0.01	-	-	-
Figuring	-	0.01	-	-	-	-
Laugh	0.05	0.10	0.01	0.02	0.02	0.01
Looks at	0.04	0.03	0.14	0.14	0.08	0.05
Meddling	0.05	0.11	0.01	0.02	-	-
Mimicking	-	0.01	-	0.01	-	-
Physical contact	0.01	0.01	0.01	0.01	-	-
Positive feedback	-	-	0.01	-	0.01	0.02
Pupil listening	0.01	0.02	0.01	0.04	0.04	0.07
Request	0.01	0.05	0.11	0.14	0.04	0.02
Social relationships	0.01	0.02	0.03	0.01	0.02	0.02
Tattling	0.03	0.02	0.01	0.01	0.01	0.01
Teasing	0.04	0.01	-	0.02	-	0.01
Affective Behavior						
Affect	0.04	0.05	0.04	0.03	0.10	0.08
Anger	-	0.02	-	-	-	-
Bizarre behavior	0.01	0.02	-	-	-	-
Complaining	0.06	0.05	0.05	0.05	0.01	-
Conduct	0.23	0.38	0.03	0.05	-	0.02
Crying	-	-	-	0.01	-	-
Enthusiasm	-	-	-	0.02	0.04	0.03
Making faces	0.02	0.03	0.01	0.01	-	-
Frustration	-	-	0.01	0.01	-	-
Giggling	0.03	0.02	0.02	0.02	-	-
Impertinence	-	0.02	-	-	-	-
Play	0.19	0.40	0.12	0.13	0.01	0.02

Table 3.2b (Continued)

Mean Student Behavior, by Appropriateness of Behavior by Sex of Student, Based on a Sample of 139 Girls and 132 Boys (Year 2)

Student Behavior	Quality of Behavior: Inappropriate Girls	Inappropriate Boys	Neutral Girls	Neutral Boys	Appropriate Girls	Appropriate Boys
Affective Behavior (Continued)						
Responsiveness	0.07	0.24	0.19	0.22	0.28	0.21
Sharing	0.09	0.21	0.19	0.21	0.20	0.17
Stops behavior	-	0.01	0.03	0.06	0.01	0.03
Whining	0.01	-	-	-	-	-
Whispering	0.15	0.10	0.02	0.05	-	0.02
Yelling	-	0.05	0.01	-	-	-
Personality Traits and Attitudes						
Nervous habits	0.01	-	0.06	0.03	-	-
Personal need	-	0.02	0.02	0.04	0.01	0.01
Self-concept	-	-	-	0.01	0.01	-
Physical Charcteristics and Activities						
Eating behavior	-	-	-	-	-	0.02
Fatigue	-	-	-	0.01	-	-
Motor behavior	-	-	0.01	0.01	-	-
Physical appearance	-	-	0.01	-	-	-
Restlessness	-	0.01	-	-	-	-
Sucking behavior	0.05	0.01	0.01	0.01	-	-
Health and Illness						
Illness	-	-	0.01	-	-	-
Injury	-	-	-	-	-	0.01
Administrative-Other						
Aid teacher	-	-	0.01	0.02	0.21	0.21
Scheduling	-	0.01	0.03	0.02	0.04	0.10

Table 3.3

Gender Differences in Weighted Micro Events

	Mean frequency of events per target student			
	Year 1		Year 2	
	Girls	Boys	Girls	Boys
Girl Event ≥ 1.5 Boy Event				
Neutral finished	.12	.07		
Positive social relations	.09	.05		
Neutral convergent production			.05	.02
Negative direction following			.07	.04
Neutral egress			.07	.04
Positive looks at			.08	.05
Positive request			.04	.02
Negative whispering			.15	.10
Neutral nervous habits			.06	.03
Negative sucking behavior			.05	.01
Positive cooperation			.12	.07
Boy Event ≥ 1.5 Girl Event				
Negative academic performance			.04	.07
Neutral academic performance			.04	.07
Positive oral reading			.02	.05
Negative attention span	.01	.05		
Negative direction following	.09	.18		
Neutral direction following	.20	.36		
Negative diversionary tactics	.04	.08		
Neutral diversionary tactics	.02	.06		
Neutral egress	.10	.18		
Negative engagement	.16	.35	.04	.08
Negative participation	.10	.20	.08	.15
Neutral pupil request			.04	.11
Negative sitting behavior	.15	.24		
Neutral sitting behavior	.14	.26	.09	.14
Negative talking*	.97	1.42		
Negative wandering	.04	.11		
Neutral wandering	.02	.11		
Neutral withdrawal	.04	.08		
Negative work habits	.11	.23	.12	.27
Negative aggression			.03	.06
Negative attention getting	.08	.27		
Neutral attention getting	.06	.17		
Neutral cooperation	.05	.09		

*Included due to unusually high frequency of event; no other high frequency event displayed such marked sex difference.

Table 3.3 (Continued)

Gender Differences in Weighted Micro Events

	Mean frequency of events per target student			
	Year 1		Year 2	
	Girls	Boys	Girls	Boys
Boy Event ≥ 1.5 Girl Event (continued)				
Negative disrupting conduct	.09	.37	.15	.38
Neutral disrupting conduct	.01	.05		
Negative laughing	.10	.25	.05	.10
Neutral laughing	.12	.20		
Negative meddling			.05	.11
Positive pupil listening			.04	.07
Negative request			.01	.05
Negative teasing	.04	.11		
Neutral teasing	.02	.04		
Negative conduct	.19	.31	.23	.38
Neutral conduct	.17	.35	.03	.05
Negative giggling	.04	.06		
Negative impertinence	.04	.06		
Negative playing	.23	.58	.19	.40
Neutral playing	.16	.26		
Negative responsiveness	.05	.11	.07	.24
Neutral responsiveness	.17	.26		
Negative sharing			.09	.21
Neutral stops behavior			.03	.06
Neutral whispering			.02	.05
Neutral personal need			.02	.04
Negative nervous habits	.02	.07		
Neutral fatigue	.06	.12		
Positive motor behavior	.02	.04		
Negative restlessness	.02	.04		
Neutral restlessness	.07	.11		
Neutral sucking	.06	.09		
Neutral scheduling	.05	.10	.05	.10

girls was labeled inappropriate and one was labeled appropriate. In Year 2, 15 of the 23 (65%) behaviors that occurred more frequently for boys were labeled inappropriate and three were labeled appropriate; two of the more frequently occurring girls' behaviors were labeled inappropriate and one was labeled appropriate. In both years, boys were observed to engage in more inappropriate, disruptive behavior--playing in class, disrupting the class, and generally exhibiting poor conduct and work habits--than were girls. Boys accounted for approximately two-thirds of all inappropriate behavior observed (Figure 3.1).

3.C. Antecedent Teacher Behavior

Sixty-five different observed teacher behaviors that precipitated student behavior were grouped into seven general categories: (1) eliciting, (2) instructing, (3) managing, (4) positive response, (5) neutral response, (6) negative response and (7) miscellaneous. Relatively few student behaviors were precipitated by any teacher behaviors: 19.7% of girls' behavior and 19.6% of boys' behavior in Year 1 and 18.7% of girls' behavior and 20.7% of boys' behavior in Year 2. In Year 2 only, more boy behaviors were precipitated by the teacher.

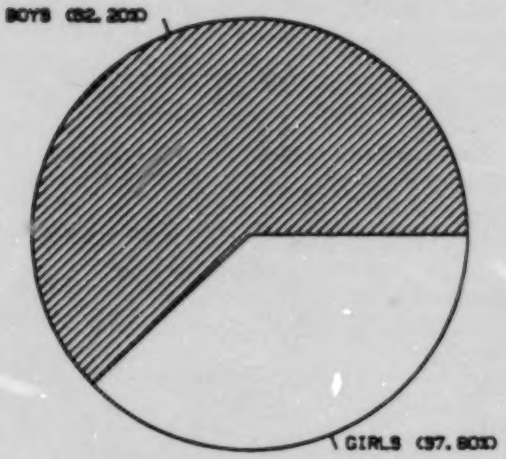
3.C.1. Sex differences in types of antecedent teacher behavior

To examine whether there were differences in the types of antecedent teacher behaviors directed at girls versus boys, cross-tabulations were computed (Tables 3.4a and 3.4b). In the first year, sex differences were observed (Chi-square (6) = 25.68, $p < .01$), but in the second year they were not (Chi-square (6) = 2.45, n.s.). The sex differences observed in the first year were slight, and were concentrated in two categories: eliciting--asking, requesting or calling on students--and negative teacher response. For Year 1, more of the girls' behavior that was preceeded by teacher behavior was elicited (51.5% versus 47.3% for boys) and more boy behavior was preceeded by a negative teacher response (5.4% versus 3.7% for girls).

3.C.2. Antecedent teacher behavior within subject matter

Leinhardt, Seewald and Engel (1979) have argued that teachers differentiate in their behaviors toward girls and boys according to subject matter, giving girls more opportunities and encouragement in reading, and boys more in mathematics. To investigate this, we first computed the proportion of student behaviors precipitated by any teacher behavior, for each subject matter area. In this analysis, we included only student observations that were recorded during reading, language arts, mathematics, science or social studies classes. Table 3.5 indicates that in Year 1, girls were called on slightly more frequently than boys in reading and language arts, but no other sex differences

YEAR 1



YEAR 2

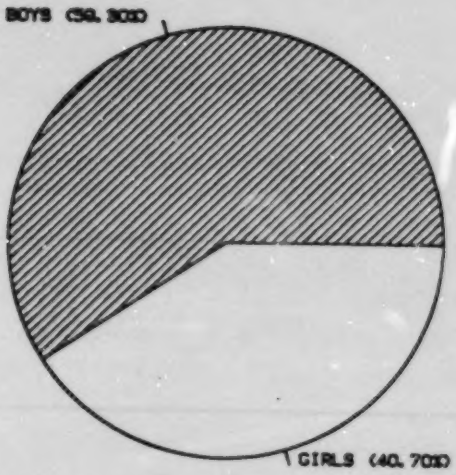


Figure 3.1 Percent of observed inappropriate behaviors initiated by boys and by girls, by year.

COPY AVAILABLE

Table 3.4a

Percentage of Target Student Behaviors Precipitated by Antecedent Teacher Behavior by Type of Student Behavior, Appropriateness of Behavior, and Sex (Year 1)

Target student behavior	Antecedent teacher behavior							Significance
	Instructing		Positive		Negative			
	Eliciting	Managing			Neutral		Misc.	
Inappropriate academic performance:								
Boy (N = 66)	84.8	10.6	1.5	1.5	0.0	1.5	0.0	n.s.
Girl (N = 48)	87.5	10.4	2.1	0.0	0.0	0.0	0.0	
Neutral academic performance:								
Boy (N = 60)	85.0	11.7	3.3	0.0	0.0	0.0	0.0	n.s.
Girl (N = 68)	88.2	11.8	0.0	0.0	0.0	0.0	0.0	
Appropriate academic performance:								
Boy (N = 415)	87.2	11.8	0.2	0.0	0.7	0.0	0.0	.05
Girl (N = 420)	88.8	8.8	1.2	1.0	0.2	0.0	0.0	
Inappropriate orientation to instruction:								
Boy (N = 156)	35.3	39.7	12.8	0.0	3.8	8.3	0.0	n.s.
Girl (N = 85)	45.9	34.1	8.2	0.0	4.7	7.1	0.0	
Neutral orientation to instruction:								
Boy (N = 305)	30.8	35.1	17.4	0.7	4.6	10.8	0.7	n.s.
Girl (N = 219)	33.8	36.1	16.4	0.9	3.7	8.2	0.9	
Appropriate orientation to instruction:								
Boy (N = 813)	40.6	37.0	15.3	0.5	3.4	2.8	0.4	.04
Girl (N = 850)	44.5	37.4	12.9	1.2	2.5	1.5	0.0	
Inappropriate interactions:								
Boy (N = 53)	22.6	43.4	15.1	1.9	7.5	7.5	1.9	n.s.
Girl (N = 22)	27.3	31.8	18.2	0.0	9.1	13.6	0.0	
Neutral interactions:								
Boy (N = 50)	18.0	40.0	14.0	0.0	10.0	14.0	4.0	n.s.
Girl (N = 39)	20.5	46.2	10.3	5.1	5.1	10.3	2.6	
Appropriate interactions:								
Boy (N = 27)	25.9	37.0	18.5	7.4	3.7	7.4	0.0	n.s.
Girl (N = 36)	2.8	58.3	30.6	2.8	2.8	2.8	0.0	
Inappropriate affective behavior:								
Boy (N = 91)	28.6	35.2	7.7	0.0	7.7	20.9	0.0	n.s.
Girl (N = 49)	28.6	38.8	2.0	0.0	6.1	25.4	0.0	
Neutral affective behavior:								
Boy (N = 139)	29.5	27.3	15.8	2.9	10.8	12.9	0.7	n.s.
Girl (N = 91)	30.8	30.8	11.0	2.2	11.0	14.2	0.0	
Appropriate affective behavior:								
Boy (N = 175)	56.0	18.9	10.9	4.6	3.4	5.7	0.6	n.s.
Girl (N = 143)	50.3	24.5	9.8	4.2	5.6	5.6	0.0	

Table 3.4b

Percentage of Target Student Behaviors Precipitated by Antecendent Teacher Behavior by Type of Student Behavior, Appropriateness of Behavior, and Sex (Year 2)

Target student behavior	Antecedent teacher behavior: Instructing: Eliciting	Instructing: Managing	Positive	Neutral	Negative	Misc.	Significance
Inappropriate academic performance:							
Boy (N = 9)	100.0	0.0	0.0	0.0	0.0	0.0	n.s.
Girl (N = 4)	100.0	0.0	0.0	0.0	0.0	0.0	
Neutral academic performance:							
Boy (N = 10)	90.0	10.0	0.0	0.0	0.0	0.0	n.s.
Girl (N = 12)	75.0	25.0	0.0	0.0	0.0	0.0	
Appropriate academic performance:							
Boy (N = 86)	96.5	2.3	0.0	0.0	1.2	0.0	n.s.
Girl (N = 68)	97.1	1.5	0.0	0.0	1.5	0.0	
Inappropriate orientation to instruction:							
Boy (N = 42)	50.0	26.2	4.8	0.0	7.1	9.5	2.4 n.s.
Girl (N = 27)	44.4	14.8	11.1	0.0	11.1	18.5	0.0
Neutral orientation to instruction:							
Boy (N = 75)	44.0	29.3	6.7	4.0	8.0	6.7	1.3 n.s.
Girl (N = 67)	53.7	23.9	6.0	1.5	11.9	3.0	0.0
Appropriate orientation to instruction:							
Boy (N = 187)	56.7	28.9	7.5	0.5	4.3	2.1	0.0 n.s.
Girl (N = 176)	58.5	26.7	4.5	1.1	4.0	3.4	1.7
Inappropriate interactions:							
Boy (N = 18)	27.8	38.9	11.1	5.6	0.0	16.7	0.0 n.s.
Girl (N = 11)	36.4	45.5	0.0	0.0	9.1	9.1	0.0
Neutral interactions:							
Boy (N = 6)	33.3	16.7	33.3	0.0	0.0	16.7	0.0 n.s.
Girl (N = 1)	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Appropriate interactions:							
Boy (N = 6)	33.3	50.7	0.0	0.0	16.7	0.0	0.0 n.s.
Girl (N = 4)	25.0	75.0	0.0	0.0	0.0	0.0	0.0
Inappropriate affective behavior:							
Boy (N = 43)	44.2	16.3	11.6	0.0	2.3	25.6	0.0 n.s.
Girl (N = 11)	18.2	45.5	18.2	0.0	0.0	18.2	0.0
Neutral affective behavior:							
Boy (N = 29)	44.8	20.7	10.3	0.0	13.8	10.3	0.0 n.s.
Girl (N = 28)	32.1	32.1	10.7	0.0	10.7	14.3	0.0
Appropriate affective behavior:							
Boy (N = 31)	64.5	9.7	9.7	6.5	3.2	6.5	0.0 n.s.
Girl (N = 34)	67.6	23.5	2.9	5.9	0.0	0.0	0.0

Table 3.5

Percentage of all Student Behaviors in 5 Subjects Precipitated by Teacher Behaviors, by Student Sex and Year

	Year 1		Year 2	
Subject	Boy	Girl	Boy	Girl
Reading	9.9	12.1	17.7	20.2
Language Arts	10.8	12.0	26.5	20.9
Math	10.2	9.9	22.7	24.5
Science	12.4	12.2	18.3	6.8
Social Studies	11.5	11.4	24.7	20.3

were observed. Both girls and boys were called on about 10% of the time in math class, about 11% of the time in social studies and about 12% of the time in science. In Year 2, a higher proportion of boy behavior in language arts, science and social studies was precipitated by the teacher, while a higher proportion of girl behavior in math and reading was precipitated by the teacher. The differences between the sexes were more pronounced in Year 2 than in Year 1.

To more specifically examine whether teachers employed different strategies to encourage student participation, we broke down antecedent teacher behavior into its seven categories, focusing primarily on teacher "eliciting" behavior: that is, directly calling on the target student. We conducted cross-tabulations of the seven categories of antecedent teacher behavior by student sex, within each of the five subject areas: reading, language arts, mathematics, science and social studies. In Year 1, significant sex differences were found for reading (Chi-square (6) = 24.44, $p < .01$) only. In reading, a higher proportion of girl behavior that was preceded by teacher behavior (64.2%) followed being called on than did similar boy behavior (52.6%). In all other subjects, the proportion of boy and girl behavior precipitated by teacher elicitation was roughly similar. In Year 2, no significant sex differences were observed for any subject area (Table 3.6).

3.D. Teacher Responses

Teacher responses to student behaviors were coded into eight general categories: (1) instructing, (2) positive reaction, (3) neutral reaction including "none", (4) negative reaction, (5) managing, (6) feelings, (7) attitudes and (8) other. A complete description of the behaviors that fall under each of these categories is contained in Volume II. Teacher behaviors were noted only in connection with the

Table 3.6

Percentage of Student Behaviors Elicited by Teacher, by Sex Within Subject Matter and Year, for Behaviors Preceded by Antecedent Teacher Behavior

	Year 1		Year 2	
Subject	Boy	Girl	Boy	Girl
Reading	52.6	64.2	69.5	60.4
Language Arts	51.7	54.4	74.2	61.7
Mathematics	48.5	48.5	52.2	66.9
Science	52.9	53.3	47.1	60.0
Social Studies	55.4	58.1	54.2	73.3

behavior of the target student and were not recorded independently of his or her behavior. Thus, the student behavior is the contingency for the teacher behavior. This contingency analysis distinguishes the present study from others in which the teacher or the teacher-student dyad is the object of observations; it must be taken into account when comparing the results of these analyses with other studies of teacher responses to student behavior in which the student behavior is not the contingency for the teacher response.

Cross-tabulations of teacher responses to student behaviors were conducted and Chi-square analyses were computed; a summary of these analyses for the first four general categories of student behavior (which accounted for over 95% of all observed behavior) is presented in Tables 3.7a & b, and 3.8a & b. Because a high proportion of student behaviors were followed by no teacher response--a valid response, noted by the observers--these cross-tabulations were computed twice: once with "no response" included as a response (Tables 3.7a & b), and once in which "no response" was omitted from the analysis (Tables 3.8a & b).

Overall, teachers tended to ignore students for all categories of student behavior other than academic performance. When students were engaged in academic performance, teachers responded to them, and generally responded in a manner consistent with the behavior. That is, when the academic performance was judged to be "inappropriate", the teacher never responded positively, but rather concentrated on instructing the student or giving a negative response. When the student's behavior was "neutral", the teacher's response was either to give instruction or to respond neutrally. When the student's academic

Table 3.7a

Percentage of Teacher Responses to Behavior of Boys and Girls,

by Type of Student Behavior (Year 1)

	Teacher response						
	Positive		Negative			Other	
Weighted Macro Event	Instruct		Neutral		Managing		Significance
Inappropriate academic performance:							
Boy (N = 95)	47.4	-	16.8	21.1	-	14.7	.05
Girl (N = 76)	35.5	-	28.9	22.4	-	13.2	
Neutral academic performance:							
Boy (N = 110)	38.2	7.3	40.0	8.2	-	6.3	.01
Girl (N = 99)	43.4	9.1	29.3	17.2	-	1.0	
Appropriate academic performance:							
Boy (N = 602)	11.1	55.0	32.1	-	-	1.8	n.s.
Girl (N = 584)	12.3	56.3	30.0	-	-	1.5	
Inappropriate orientation to instruction:							
Boy (N = 1286)	2.8	-	81.4	1.9	13.3	0.7	n.s.
Girl (N = 821)	3.0	-	81.2	1.6	13.8	0.4	
Neutral orientation to instruction:							
Boy (N = 2283)	8.1	1.4	83.2	2.0	5.0	0.2	.01
Girl (N = 1952)	8.1	2.5	84.1	1.2	3.7	0.5	
Appropriate orientation to instruction:							
Boy (N = 4301)	11.5	3.9	82.7	0.5	1.0	0.4	n.s.
Girl (N = 4514)	12.0	4.0	82.5	0.3	0.8	0.4	
Inappropriate interactions:							
Boy (N = 527)	0.9	-	75.0	3.0	19.9	1.2	n.s.
Girl (N = 243)	1.2	-	79.0	2.1	16.5	1.2	
Neutral interactions:							
Boy (N = 519)	2.3	1.5	89.8	-	5.0	1.4	n.s.
Girl (N = 421)	1.9	2.1	88.4	-	6.2	1.5	
Appropriate interactions:							
Boy (N = 220)	-	8.2	87.3	-	-	4.5	.05
Girl (N = 276)	-	8.0	85.5	-	-	6.6	
Inappropriate affective behavior:							
Boy (N = 673)	2.1	-	81.9	1.6	14.0	0.3	.01
Girl (N = 437)	2.5	-	83.8	1.1	10.8	1.8	
Neutral affective behavior:							
Boy (N = 687)	5.7	2.0	83.1	1.5	6.8	0.9	.01
Girl (N = 564)	5.0	1.8	86.3	1.6	3.4	2.0	
Appropriate affective behavior:							
Boy (N = 463)	8.9	12.1	73.9	-	1.5	3.6	n.s.
Girl (N = 463)	9.1	9.7	76.2	-	1.3	3.6	

Table 3.7b

Percentage of Teacher Responses to Behavior of Boys and Girls,

by Type of Student Behavior (Year 2)

	Teacher response						
	Positive			Negative		Other	
Weighted Macro Event	Instruct		Neutral		Managing		Significance
Inappropriate academic performance:							
Boy (N = 12)	50.0	-	33.3	8.3	8.3	-	n.s.
Girl (N = 8)	75.0	-	12.5	-	12.5		
Neutral academic performance:							
Boy (N = 11)	54.5	18.2	18.2	9.1	-	-	n.s.
Girl (N = 15)	46.7	13.3	33.3	-	-	6.7	
Appropriate academic performance:							
Boy (N = 107)	9.3	67.3	23.4	-	-	-	n.s.
Girl (N = 86)	16.3	64.0	19.8	-	-	-	
Inappropriate orientation to instruction:							
Boy (N = 211)	5.7	-	73.5	3.8	16.1	0.9	n.s.
Girl (N = 170)	7.1	-	74.7	1.8	16.5	-	
Neutral orientation to instruction:							
Boy (N = 317)	24.0	4.4	63.1	2.5	4.4	1.6	.10
Girl (N = 292)	19.5	3.8	71.9	1.0	3.8	-	
Appropriate orientation to instruction:							
Boy (N = 715)	19.7	8.0	71.0	0.3	0.7	0.3	n.s.
Girl (N = 721)	17.8	9.2	72.1	-	0.7	0.3	
Inappropriate interactions:							
Boy (N = 100)	7.0	-	58.0	4.0	28.0	3.0	n.s.
Girl (N = 56)	3.6	-	73.2	-	23.2	-	
Neutral interactions:							
Boy (N = 27)	11.1	3.7	77.8	-	7.4	-	n.s.
Girl (N = 27)	11.1	-	77.8	-	11.1	-	
Appropriate interactions:							
Boy (N = 19)	-	5.3	89.5	-	-	5.3	n.s.
Girl (N = 24)	8.3	-	87.5	-	-	4.2	
Inappropriate affective behavior:							
Boy (N = 175)	6.3	-	73.7	1.1	18.9	-	n.s.
Girl (N = 100)	5.0	1.0	79.0	2.0	13.0	-	
Neutral affective behavior:							
Boy (N = 74)	20.3	2.7	66.2	1.4	6.8	2.7	n.s.
Girl (N = 69)	15.9	5.8	69.6	-	7.2	1.4	
Appropriate affective behavior:							
Boy (N = 55)	18.2	14.5	65.5	-	-	1.8	n.s.
Girl (N = 62)	16.1	17.7	66.1	-	-	-	

Table 3.8a

Percentage of Teacher Responses (excluding "None") to Behavior of Boys and Girls, by Type of Student Behavior (Year 1)

	Teacher Response						
	Positive			Negative		Other	
Weighted Macro Event	Instruct		Neutral		Managing		Significance
Inappropriate academic performance:							
Boy (N = 81)	55.6	4.9	2.5	24.7	12.3	0.0	n.s.
Girl (N = 54)	50.0	7.4	0.0	31.5	7.4	3.7	
Neutral academic performance:							
Boy (N = 66)	63.6	12.1	0.0	13.6	6.1	4.5	n.s.
Girl (N = 73)	58.9	12.3	4.1	23.3	0.0	1.4	
Appropriate academic performance:							
Boy (N = 425)	15.8	77.9	4.0	0.7	0.5	1.2	n.s.
Girl (N = 424)	17.0	77.6	3.3	0.5	1.2	0.5	
Inappropriate orientation to instruction:							
Boy (N = 246)	14.6	2.0	2.8	9.8	69.5	1.2	n.s.
Girl (N = 160)	15.6	1.9	3.8	8.1	70.6	0.0	
Neutral orientation to instruction:							
Boy (N = 416)	44.5	7.9	7.9	11.1	27.4	1.2	.01
Girl (N = 338)	47.0	14.5	8.0	6.8	21.6	2.1	
Appropriate orientation to instruction:							
Boy (N = 782)	63.2	21.4	4.7	2.6	5.8	2.4	n.s.
Girl (N = 825)	65.8	21.9	4.4	1.6	4.2	2.1	
Inappropriate interactions:							
Boy (N = 135)	3.7	2.2	2.2	11.9	77.8	2.2	n.s.
Girl (N = 53)	5.7	3.8	3.8	9.4	75.5	1.9	
Neutral interactions:							
Boy (N = 56)	21.4	14.3	5.4	5.4	46.4	7.1	n.s.
Girl (N = 51)	15.7	17.6	3.9	3.9	51.0	7.8	
Appropriate interactions:							
Boy (N = 33)	12.1	54.5	15.2	0.0	18.2	0.0	n.s.
Girl (N = 47)	14.9	46.8	14.9	6.4	6.4	10.6	
Inappropriate affective behavior:							
Boy (N = 133)	10.5	0.0	8.3	8.3	70.7	2.3	.07
Girl (N = 77)	14.3	6.5	7.8	6.5	61.0	3.9	
Neutral affective behavior:							
Boy (N = 126)	31.0	11.1	7.9	7.9	37.3	4.8	n.s.
Girl (N = 85)	32.9	11.8	9.4	10.6	22.4	12.9	
Appropriate affective behavior:							
Boy (N = 128)	32.0	43.8	5.5	1.6	5.5	11.7	n.s.
Girl (N = 117)	35.9	38.5	6.0	1.7	5.1	12.8	

Table 3.8b

Percentage of Teacher Responses (excluding "None") to Behavior of Boys and Girls, by Type of Student Behavior (Year 2)

	Teacher Response						
	Positive			Negative		Other	
Weighted Macro Event	Instruct		Neutral		Managing		Significance
Inappropriate academic performance:							
Boy (N = 8)	75.0	0.0	0.0	12.5	12.5	0.0	n.s.
Girl (N = 7)	85.7	0.0	0.0	0.0	14.3	0.0	
Neutral academic performance:							
Boy (N = 9)	66.7	22.2	0.0	11.1	0.0	0.0	n.s.
Girl (N = 10)	70.0	20.0	0.0	0.0	10.0	0.0	
Appropriate academic performance:							
Boy (N = 91)	11.0	79.1	9.9	0.0	0.0	0.0	n.s.
Girl (N = 74)	18.9	74.3	6.8	0.0	0.0	0.0	
Inappropriate orientation to instruction:							
Boy (N = 58)	20.7	0.0	3.4	13.8	58.6	3.2	n.s.
Girl (N = 45)	26.7	0.0	4.4	6.7	62.2	0.0	
Neutral orientation to instruction:							
Boy (N = 123)	61.8	11.4	4.9	6.5	11.4	4.1	n.s.
Girl (N = 90)	63.3	12.2	8.9	3.3	12.2	0.0	
Appropriate orientation to instruction:							
Boy (N = 236)	59.7	24.2	12.3	0.8	2.1	0.8	n.s.
Girl (N = 217)	59.0	30.4	7.4	0.0	2.3	0.0	
Inappropriate interactions:							
Boy (N = 44)	15.9	0.0	4.5	9.1	63.6	6.8	n.s.
Girl (N = 18)	11.1	0.0	16.7	0.0	72.2	0.0	
Neutral interactions:							
Boy (N = 7)	42.9	14.2	14.3	0.0	28.6	0.0	n.s.
Girl (N = 6)	50.0	0.0	0.0	0.0	50.0	0.0	
Appropriate interactions:							
Boy (N = 3)	0.0	33.3	33.3	0.0	0.0	33.3	n.s.
Girl (N = 3)	66.7	0.0	0.0	0.0	0.0	33.3	
Inappropriate affective behavior:							
Boy (N = 48)	22.9	0.0	4.2	4.2	68.8	0.0	n.s.
Girl (N = 23)	21.7	4.3	8.7	8.7	56.5	0.0	
Neutral affective behavior:							
Boy (N = 27)	55.6	7.4	7.4	3.7	18.5	7.4	n.s.
Girl (N = 24)	45.8	16.7	12.5	0.0	20.8	4.2	
Appropriate affective behavior:							
Boy (N = 24)	41.7	33.3	20.8	0.0	0.0	4.2	n.s.
Girl (N = 25)	40.0	44.0	16.0	0.0	0.0	0.0	

In general, teachers did not respond differently to girls' behavior than to boys' behavior. In Year 1, of the 12 cross-tabulations computed, six yielded statistically significant sex differences; an inspection of the figures in Table 3.7a shows, however, that not all of these statistically significant differences could be considered meaningful. When "no response" was excluded as a valid teacher response (Table 3.8a), only two statistically significant differences remained, approximately the number obtainable by chance. In Year 2, one of the twelve cross-tabulations yielded a statistically significant sex difference (Table 3.7b); when "no response" was excluded, no statistically significant sex differences remained (Table 3.8b). Each of the comparisons will be discussed separately.

3.D.1. Teacher instruction

In Year 1, a higher proportion of boys' academic performances that were judged to be inappropriate for the classroom received an instructing response from the teacher than did the same behavior on the part of girls. Nearly half of the boy's inappropriate academic performances received an instructing response compared to slightly more than a third of the girls' inappropriate academic performances. In Year 2, this pattern was not repeated, and only six inappropriate academic performances were observed for either girls or boys. In Year 1, girls received approximately 5% more instructing teacher responses for their "neutral" academic performances than did boys. Again, the number of behaviors (seven) for Year 2 was too small to analyze meaningfully.

3.D.2. Teacher positive responses

There was no evidence, from either Year 1 or Year 2 that boys received more positive teacher responses than girls, or that girls received more positive teacher responses than boys did, for any type of student behavior. Both boys and girls received a positive teacher response over half of the time for appropriate academic performances in Year 1, and over 60% of the time for Year 2.

3.D.3. Teacher neutral response

A neutral response from the teacher was defined as looking at the student with no verbal response, simply acknowledging the student's behavior, providing no feedback, ignoring, or not responding at all. In our analyses, we examined first all forms of neutral responses, and then those that actually entailed some form of response, excluding "no response" and "ignores." For all categories of student behavior except "academic performance", neutral teacher responses accounted for over 80% of all teacher responses in Year 1 and for over 70% of all teacher responses in Year 2; omitting "ignoring" responses changed these percentages to 15% in Year 1 and less than 10% in Year 2.

In Year 1, girls received over 10% more total neutral responses (including "none") for their inappropriate academic performances than did boys, and boys received over 10% more total neutral teacher

responses for their "neutral" academic performances than did girls. No such differences were observed in Year 2.

When "ignoring" responses were omitted from analysis, the number of student behaviors receiving teacher responses declined substantially, from 23,565 behaviors to 5,077 behaviors in Year 1 and from 5,262 behaviors to 1,236 behaviors in Year 2. The difference in teacher response to inappropriate academic performance in Year 1 was no longer statistically significant.

3.D.4. Teacher negative responses

In Year 1, girls received twice as many negative responses (17%) to their "neutral" academic performances as did boys (8%). This was the only category of student behavior in which teachers' negative responses were different for girls than for boys. In Year 2, there was no category of behavior in which teachers gave proportionately more negative responses to either sex.

3.D.5. Teacher managing responses

Managing responses included disciplining, intervening, mediating, managing, punishing physically, redirecting, reprimanding, reminding and seating students. In Year 1, boys received more managing teacher responses (5%) to their "neutral" orientation to instruction than did girls (3.7%); boys also received more managing responses from teachers for inappropriate and "neutral" affective behavior than did girls. In Year 2, there was no category of student behavior to which teachers gave proportionately more managing responses for either boys or girls.

3.D.6. Other responses

Two categories of possible teacher responses were observed infrequently: responses to pupil's feeling and "attitudes." No separate analyses of these teacher response categories were undertaken. Instead, they are included in the "Other" category that is reported in Tables 3.6 and 3.7, along with other valid teacher responses that occurred infrequently (cell frequencies smaller than 5) for a given student behavior. "Other" responses occurred infrequently for both years of the study. There were few sex differences in receiving "other" teacher responses in Year 1 and no sex differences in Year 2. In Year 1, boys received more "other" responses than girls for "neutral" academic performances, and girls received more "other" responses than boys for interactions judged to be appropriate, for affective behavior judged to be inappropriate and for "neutral" affective behavior.

3.D.7. Teacher responses within subject matter

To investigate whether or not teacher responses to the behavior of boys and girls differed within subject matter, the above analyses were repeated separately for reading, language arts, mathematics, science and social studies. Of the sixty Chi-square analyses that were conducted,

only three in Year 1 and none in Year 2 indicated statistically significant differences between teacher responses to the behavior of boys and girls. Since three statistically significant differences per year would be expected by chance (5% of 60 = 3), we concluded that teacher responses did not differentiate between boys and girls for the same student behavior within subject matter.

3.D.8. Teacher responses to the quality of student behavior

We noted a substantial difference between the proportion of boy behavior judged to be inappropriate and the proportion of girl behavior judged to be inappropriate, and we speculated that teachers might respond differently to the appropriate and inappropriate behaviors of girls versus boys. Our analysis showed, however, that teachers did not make such distinctions (Table 3.9). Teachers ignored approximately three-quarters of all student behavior: inapproporiate behavior (79.2% for girls and 78.1% for boys in Year 1; 74.6% for girls and 69.5% for boys in Year 2), neutral behavior (84.0% for girls and 83.9% for boys in Year 1; 71.2% for girls and 64.6% for boys in Year 2), and appropriate behavior (77.2% for girls and 76.0% for boys in Year 1; 67.5% for girls and 60.2% for boys in Year 2). When we looked at behaviors to which teachers responded, we found that the teacher's behavior was--on the whole--appropriate to the student behavior and not affected by the sex of the student. Teachers managed or censured inappropriate behavior, instructed neutral behavior, and positively evaluated appropriate behavior. Only one sex difference was observed. In Year 1, teachers responded to girls' neutral behavior with slightly more positive reactions and to boys neutral behavior with more managing responses (Chi-square (5) = 13.57, $p < .01$).

3.E. Peer Interactions

Peer behavior that directly precipitated target student behavior was recorded by the observers as "antecedent pupil behavior" and peer behavior in response to target student behavior was recorded as "other pupil response." The appropriateness of these behaviors was also judged and noted by the observer.

3.E.1. Antecedent peer behavior

Relatively few observed student behaviors were precipitated by behavior on the part of other students for either girls or boys and for either year of the study (Table 3.10). The difference in the amount of peer interaction between Year 1 and Year 2 should not be interpreted as an actual increase; the change reflects an increased emphasis on peer interaction in the design of the observation sheets for Year 2. Observers were required to note--for each observation record--whether or not a target student behavior was preceeded by a precipitating peer behavior; if so, what the sex of the peer was (a boy or boys, a girl or girls, or a group of two or more students that included both a boy and a girl); and what the judged appropriateness of the behavior was. Places

Table 3.9

Percentage of Teacher Responses to Inappropriate, Neutral and Appropriate Student Behaviors by Year of Observation

Weighted Macro Event	Teacher Response: Positive Instructing	Positive Negative	Neutral Managing	Neutral Other
Year 1				
Inappropriate[a]				
Boy (N = 2652)	3.8	0.5	78.1	2.7	14.5	0.3
Girl (N = 1613)	4.2	0.9	79.2	2.5	12.9	0.4
Neutral[b]				
Boy (N = 4067)	1.2	1.8	83.9	1.7	4.9	0.5
Girl (N = 3347)	7.5	2.6	84.0	1.6	3.6	0.7
Appropriate[c]				
Boy (N = 5756)	10.6	10.2	76.9	0.5	1.1	0.7
Girl (N = 6024)	11.1	9.8	77.2	0.3	0.8	0.6
Year 2				
Inappropriate[d]				
Boy (N = 499)	7.2	0.0	69.5	3.0	19.2	1.0
Girl (N = 342)	7.6	0.3	74.6	1.5	16.1	0.0
Neutral[e]				
Boy (N = 443)	22.6	4.3	64.6	2.3	4.7	1.6
Girl (N = 420)	19.0	4.0	71.2	0.7	4.5	0.5
Appropriate[f]				
Boy (N = 929)	17.4	15.2	66.2	0.2	0.5	0.4
Girl (N = 922)	17.1	14.4	67.5	0.0	0.5	0.4

[a] Chi-square (5) = 5.26 (n.s.)

[b] Chi-square (5) = 13.40 ($p < .02$)

[c] Chi-square (5) = 4.09 (n.s.)

[d] Chi-square (5) = 8.80 (n.s.)

[e] Chi-square (5) = 8.66 (n.s.)

[f] Chi-square (5) = 2.30 (n.s.)

Table 3.10

Percent of Target Student Behaviors Precipitated by Peer Behavior, by Sex and Year of Study

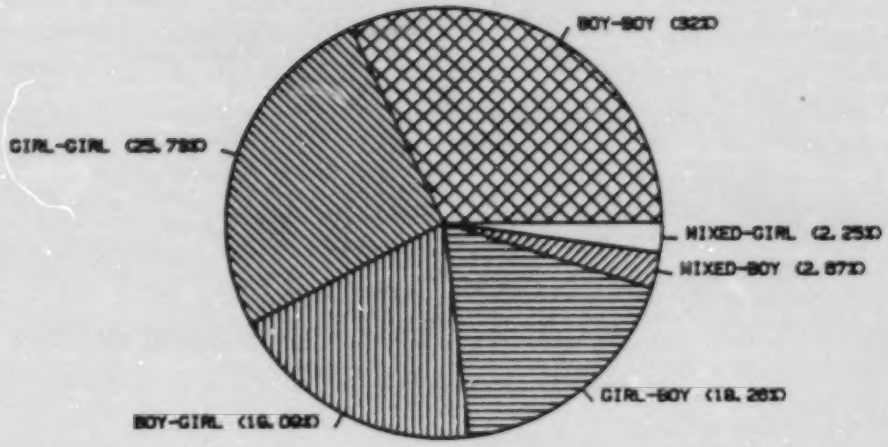
	Year 1	Year 2
Boy target		
Boy peer	4.33	6.60
Girl peer	2.49	4.25
Mixed	0.36	0.95
Girl target		
Boy peer	2.92	4.68
Girl peer	3.95	7.27
Mixed	0.34	0.55

for this summary information were provided directly on the observation form in Year 2 but not in Year 1.

In both years, same-sex interactions were more frequent than cross-sex interactions: 8.2% to 5.4% in Year 1 and 13.9% to 10.3% in Year 2. These percentages refer to all target student behavior, including behavior not involving interaction. When only those target student behaviors that were precipitated by another student's behavior are considered (Figure 3.2), we also see a higher proportion of same-sex than cross-sex interaction for both years. That is, girl behavior was more likely to be precipitated by the behavior of another girl (girl-girl) than by the behavior of a boy (boy-girl). The ratio of same-sex to cross-sex interaction was about 3:2 for both girls and boys for both years.

The appropriateness of the interaction was also recorded. Overall, a strong relationship between the appropriateness--or "quality"--of the antecedent peer behavior and the quality of the target student behavior was found. Appropriate antecedent peer behaviors precipitated appropriate target student behavior; inappropriate peer behavior precipitated inappropriate target student behavior, and neutral peer behavior precipitated neutral target student behavior for both cross-sex and same-sex interactions. Cross-tabulations of the quality of the peer behavior with the quality of the target student response were performed, and Chi-square statistics computed (Table 3.11). These statistics indicated a very strong relationship between the quality of the peer behavior and the quality of the target student behavior. The relationship appeared to be stronger for same-sex interactions than for cross-sex interactions, and group interactions seemed to be least consistent as to quality.

YEAR 1



YEAR 2

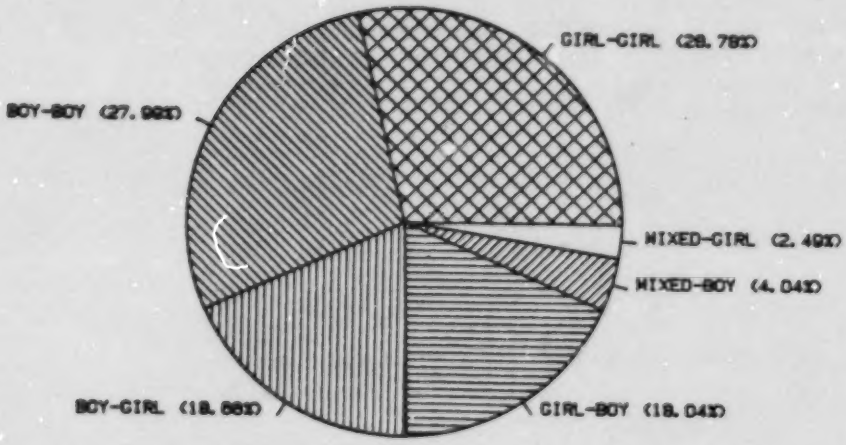


Figure 3.2 Percent of observed student interactions (antecedent student and target student), by gender of interactors.

Table 3.11

Chi-square Statistics for relationship Between the Quality of Antecedent Peer Behavior and the Quality of Target Student Behavior (df = 4)

	Year 1	Year 2
Boy target		
Boy peer	369.2***	138.0***
Girl peer	104.1***	46.5***
Mixed	31.4***	5.9 n.s.
Girl target		
Boy peer	152.8***	54.3***
Girl peer	275.7***	85.0***
Mixed	17.5**	1.8 n.s.

*** $p < .001$
** $p < .01$

3.E.2. Other peer responses

Relatively few observed student behaviors were responded to by other students; this was true for both boys and girls and for both years of the study (Table 3.12) For both years, about a quarter of all student behaviors received a response from other students; same-sex responses occurred approximately twice as often as cross-sex responses. Virtually no sex differences were observed for either year.

Table 3.12

Percent of Target Student Behaviors Responded to by Other Students, by Sex and Year of Study

	Year 1	Year 2
Boy target		
Boy peer	16.4	13.9
Girl peer	7.3	8.0
Mixed	2.5	5.3
Girl target		
Boy peer	7.5	7.9
Girl peer	16.3	12.9
Mixed	2.6	5.5

Figure 3.3 presents the proportion of interactions that entailed either cross-sex, same-sex or mixed-sex responses to target student behavior. Substantially more group (mixed-girl or mixed-boy) interactions were observed for responses than for precipitating behavior, but same-sex interactions were proportionally about as frequent. Proportionally fewer cross-sex responses were observed; on the average, the ratio of same-sex to cross-sex responses to target student behavior was about 2:1 for girls and nearly 3:1 for boys.

The quality of interactions was also recorded. Overall--as with antecedent peer behavior--a strong relationship between the quality (appropriate, neutral or inappropriate) of the target student behavior and the quality of the peer response was found. Table 3.13 summarizes these relationships by reporting the Chi-square statistics for the 12 contingency tables that were analyzed. The quality of the student behavior was a highly significant predictor of the quality of the peer response. Again, same-sex interactions appear to be more consistent than cross-sex interactions.

Table 3.13

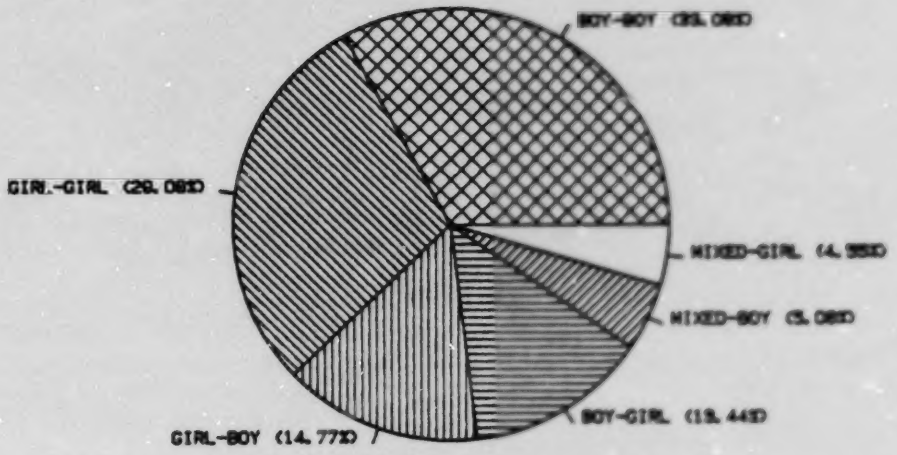
Chi-square Statistics for the Relationship Between the Quality of the Target Student Behavior and the Quality of the Peer Response
(df = 4)

	Year 1	Year 2
Boy target		
Boy peer	1161.8***	221.1***
Girl peer	324.0***	68.0***
Mixed	135.4***	30.6***
Girl target		
Boy peer	317.9***	39.9***
Girl peer	1080.8***	167.1***
Mixed	88.9***	28.1***

*** $p < .001$

The quality of most peer interactions was poor, as indicated by either target student or peer behavior being judged inappropriate. Sex differences in this indicator were found. Interactions with boy target students in both years were more likely to contain inappropriate behavior than were all-girl interactions or interactions in mixed-sex groups. Mixed-sex group interactions were the least likely to contain inappropriate behavior. In Year 1, 39% of boy-boy interactions, 38.6% of boy-girl interactions and 35.8% of girl-boy interactions contained

YEAR 1



YEAR 2

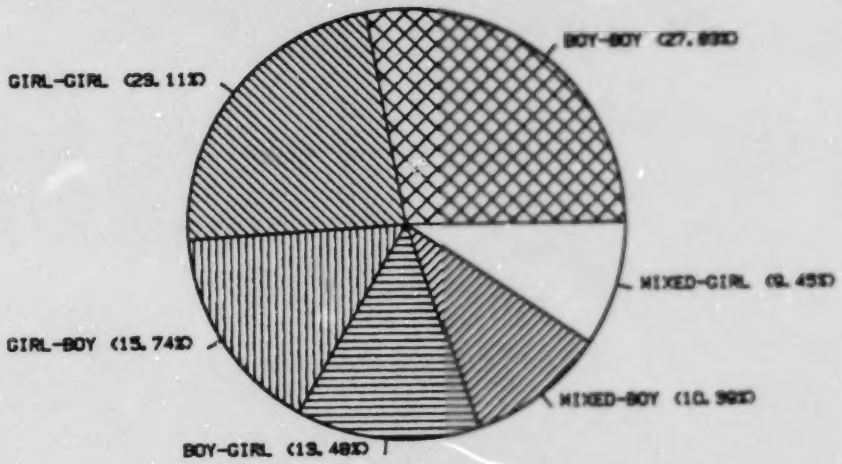


Figure 3.3 Percent of observed student interactions (other pupil response to target student), by gender of interactors.

inappropriate behavior; by comparison, 25.7% of girl-girl interactions, 25.7% of group interactions with a boy target student and 20.6% of group interactions with a girl target student contained an inappropriate behavior. In Year 2, the percentages were slightly higher, but the pattern was the same: 49.5% of boy-boy interactions, 49.2% of boy-girl interactions and 45.8% of girl-boy interactions contained inappropriate behavior; by comparison, 36.2% of girl-girl interactions, 29.1% of group interactions with a boy target student and 32.0% of group interactions with a girl target student contained inappropriate behaviors.

3.F. Summary

In this chapter we have presented results from classroom observations that demonstrate the following:

(1) Boys and girls exhibit different behavior in classroom situations, with boys exhibiting more behavior judged as inappropriate or coded as disruptive.

(2) In the first year of the study, teachers called on girls more than boys in reading, but this was not found for the second year of the study. Girls and boys were called on equally for all other subjects.

(3) Teachers responded to student behavior rather than student sex; similar behavior exhibited by both boys and girls received similar responses.

(4) Students attended to the sex of other students, initating interaction with and responding to same-sex classmates more positively and more frequently than to cross-sex classmates.

Appendix A: Reliability of observations and coding

1. Interobserver reliability

Approximately 30 hours of post-training double observations were conducted in Year 1 and 48 hours in Year 2. Four variables were used for comparison in Year 2: Context 1 (four categories: adult in charge of target student, another student in charge of target student, target student is working independently, target student is in charge of another student; Context 4: (three categories: target student is working alone, target student is working in a group, all students are working as a class unit). Teacher response (seven categories), target student behavior (nine categories). Two analyses were conducted. In the first, the percent category agreement between observers was computed for each variable; this ranged from 96.6% to 48.2%, with 21 of the 28 comparisons having more tha 80% agreement. The second analysis was a contingency table analysis of observer by variable within observation day. Of the 28 Chi-square statistics computed, 24 showed no statistically significant difference ($p > .10$) between observers. Results of these analyses may be found in Table 1.

Appendix Table 1

Interobserver Reliability

	Observer pair						
Reliability Indicator	1/2	1/2	1/3	6/7	7/7	2/3	2/3
Percent agreement							
Context 1	89.3	48.2	92.8	93.0	84.9	96.2	94.9
Context 4	91.2	55.4	94.0	92.5	84.9	96.2	94.9
Teacher response	91.2	55.4	79.5	86.6	83.0	91.1	93.5
Student behavior	68.0	50.6	83.1	82.4	79.2	86.1	89.8
P-values of Chi-square							
Context 1	.332	.002	.723	.644	1.000	.210	.988
Context 4	.323	.108	.631	.628	.925	1.000	.761
Teacher response	.845	.766	.048	.333	.744	.672	.830
Student behavior	.026	.124	.384	.071	.524	.764	.848

2. Intercoder reliability

Intercoder reliability was assessed through blind double coding of observation records. A separate repeated measures analysis of variance was conducted for each context code, each teacher activity code, and for

the type and quality of each antecedent teacher behavior, antecedent pupil behavior, event, teacher response, and other pupil response; the coders were treated as the repeated measures. Reliabilities for 95 variables, categorized into 18 groups, and five double codings were computed, yielding a total of 90 analyses of variance. Significant differences ($p < .10$) between coders were found for four comparisons, fewer than would be expected by chance. Cronbach's alpha ranged from .88 to 1.0, with over 80% of all reliabilities having = .98 or better. Results of these analyses may be found in Table 2.

Appendix Table 2

Intercoder Reliability

Reliability indicator	Number of variables	Coder pair 5/2	2/6	1/3	3/4	2/5
Repeated measures ANOVA						
Context 1	4	2.454[a]	.790	0.00	.545	0.00
Context 2	3	1.000	.909	0.00	1.000	0.00
Context 3	3	.750	.489	0.00	1.000	0.00
Context 4	6	5.000	1.247	0.00	.210	0.00
ATBLEXICON	7	1.000	6.359***	6.250**	.000	1.000
APBSEX	4	9.000*	.790	0.00	.086	0.00
APBQUAL	5	2.250	.801	0.00	.092	0.00
APBLEX	5	2.250	.801	0.00	.092	0.00
EVENTSEX	9	.013	.427	0.00	.022	0.00
EVENTQUAL	3	.230	.243	0.00	.073	0.00
EVENTLEXICON	7	.228	.459	0.00	.255	0.00
TRESPLEXICON	8	2.03	.392	0.00	.086	0.00
OPUPSEX	6	1.416	.393	0.049	.026	0.023
OPUPQUAL	5	.070	.065	0.216	.909	0.680
OPUPLEXICON	6	.428	.320	0.00	.232	0.00
TACTLEXICON	4	.013	.790	0.00	2.000	0.00
PACTLEXICON	7	4.500	.269	0.00	.020	0.00
TPUPQUAL	3	.001	1.000	0.00	1.000	0.00
All variables	95	.628	13.748***	.182	2.575	.068
Alpha Values						
Context 1	4	.9993	.9938	1.0000	.9977	.9998
Context 2	3	.9980	.9979	.9978	.9996	1.0000
Context 3	3	.9984	.9951	.9969	.9996	.9993
Context 4	6	.9996	.9967	.9998	.9955	.9998
ATBLEXICON	7	.9998	.9718	.9998	1.0000	.9985
APBSEX	4	.9999	.9975	1.0000	.9948	.9986
APBQUAL	5	.9997	.9975	.9997	.9951	.9988
APBLEX	5	.9997	.9975	1.0000	.9951	.9985
EVENTSEX	9	.9708	.9850	.9873	.9544	.9844
EVENTQUAL	3	.9600	.9643	.9969	.9778	.9975
EVENTLEXICON	7	.9954	.9922	.9994	.9969	.9947
TRESPLEXICON	8	.9994	.9931	.9994	.9897	.8634
OPUPSEX	6	.9941	.9952	.9987	.9848	.9775
OPUPQUAL	5	.8866	.9260	.9578	.9688	.9442
OPUPLEXICON	6	.9964	.9914	.9987	.9971	.9970
TACTLEXICON	4	.9261	.9894	.9960	.9997	.9906
PACTLEXICON	7	.9994	.9723	.9848	.9102	.9996
TPUPQUAL	3	.9177	.9983	1.0000	.9996	1.0000
All variables	95	.9575	.9932	.9984	.9923	.9903

[a] The figures are F-values. *** $p < .01$ ** $p < .05$ * $p < .10$

Chapter Four

Possible Causes of Sex Segregation

4.A. Introduction

In the previous chapter we have demonstrated that cross-sex interaction was observed significantly less frequently than same-sex interaction. Several hypotheses for why more same-sex interaction was observed are proposed. One possible explanation is related to the number of opportunities for cross-sex interactions. More mixed-sex groupings, such as small reading groups, may be related to greater cross-sex interaction. Another explanation is that the nature of cross-sex interaction is unpleasant: instead of being cooperative, it is uncomfortable, antagonistic, or negatively responded to by the teacher or other students. Teacher and peer responses may promote sex segregation through negative reinforcement of cross-sex interaction. A third explanation is that students segregate themselves as a consequence of gender stereotypes. Negative or stereotyped attitudes about cross-sex peers may lead students to choose partners of their own sex for classroom activities. Findings on these hypotheses are presented in this chapter.

4.B. Opportunities for Interaction

When students work independently or work together as a whole class, few opportunities for student interaction occur; only when classrooms are organized into small groups for instruction is it likely the students will, in fact, interact. Cross-sex grouping, moreover, should increase the likelihood of cross-sex interaction.

To determine the relationship between opportunities for interaction and observed interaction, we conducted a multiple regression analysis in which site, grade, year and the proportion of students who were girls was held statistically constant; the proportion of observed cross-sex interactions (PCTCSI) in the class was the dependent variable and the proportion of observed cross-sex group contexts (PCTCXTX) was the independent variable of interest. Table 4.1 presents the results of this analysis. Virtually no association between the number of observed small groups in the classroom and the amount of cross-sex interaction was found ($B = .03$; $t = .232$, n.s.). Substantially more cross-sex interaction was observed in Montevista than in Northern ($B = .695$; $t = 5.245$, $p < .001$), and more small groups were observed in Northern than Montevista (Lockheed & Harris, 1983). These latter groups were typically homogeneous reading groups not composed for purposes of encouraging interaction, but rather for ease in teacher monitoring of reading.

Table 4-1

Relationship of Grouping and Cross-sex Interaction in 36 Classrooms: Regression of Cross-sex Interaction on Exogenous Variables, Percent Female and Percent Mixed-sex Contexts

Dependent variable	Independent variables				
PCTCSI	In Year 1	In Grade 4	Site	PCTFEM	PCTCXTX
	.043	.225	.695***	.204*	.030

R^2 = .55 $\hat{R}^2$ = .48 F = 7.94

*** $p < .001$

* $p < .10$

4.C. A Closer Look at Student Interactions

In this section we examine both the type of interaction that took place and the nature of the behavior. As in previous chapters, interactions were defined as a target student behavior followed by another student response.

Six types of interactions were identified, contingent on the sex of the target student and the sex of the other student: (1) a boy target student and one or more boy respondents (BB), (2) a boy target student and one or more girl respondents (GB), (3) a boy target student and more than one respondent, including one boy and one girl (XB), (4) a girl target student and one or more girl respondents (GG), (5) a girl target student and one or more boy respondents (BG), a girl target student and more than one respondent, including one girl and one boy (XG).

In this analysis, we restricted behaviors to those that contributed 1% or more to any type of student interaction. Twenty-six such behaviors were identified; these accounted for approximately 80% of all interactions in both years. The 26 behaviors were grouped into the following six categories:

1. talking

2. sharing (sharing, cooperating, helping)

3. playing (whispering, laughing, giggling, playing)

4. academic engagement (attentiveness, academic performance, engagement, participation, questioning, work habits, direction-following)

5. bothering (attention getting, disrupting, conduct, meddling, making faces, teasing, aggression, controlling behavior, physical conduct)

6. looking at the other student

A description of these behaviors is provided in the APPLE lexicon. The proportion of interactions involving each of these behaviors, by year, is given in Table 4.2.

Table 4.2

Proportion of Interactions Involving Selected Target Student Behavior

Behaviors	Year 1	Year 2
Talking	31.5	24.7
Sharing	13.6	19.0
Academic engagement	12.4	16.4
Playing	10.5	7.2
Bothering	9.1	8.9
Looking at	6.2	3.5
Other behaviors	16.7	20.3

Although the relative frequency of these behaviors was virtually the same for both years, there were differences between the two years. Specifically, talking, playing and looking at were observed relatively less frequently during Year 2 than Year 1, while sharing and academic engagement were observed relatively more frequently.

Cross-tabulations of interaction type by target student behavior showed significant differences for each year (Chi-square (30) = 495.82, $p < .001$ for Year 1; Chi-square (30) = 109.46, $p < .001$ for Year 2). Students involved in certain types of interactions were observed to behave quite differently than students engaged in other types of interactions. The interactions are discussed within sex and then the sexes are compared within type of interaction.

4.C.1 Boys in same-sex versus cross-sex interaction

In both years, boys who were engaged in same-sex interaction (BB) behaved differently from boys who were engaged in cross-sex interaction (GB); the patterns were not similar for both years, however. In Year 1, boys talked and played more (35.6% and 12.8%, respectively, in same-sex interaction versus 29.9% and 9.1%, respectively, in cross-sex interaction); they bothered more in cross-sex interaction than in same-sex interaction (13.3% versus 10.4%, respectively). In Year 2, boys were observed to share more during cross-sex interactions (23.3%) than during same-sex interactions (20.1%), to bother more during

same-sex interactions (12.2%) than during cross-sex interactions (6.8%), and to talk equally in both situations (Table 4.3). Mixed-sex group behavior (XB) differed from both cross-sex and same-sex interaction in both years. A higher proportion of boy's behavior in mixed-sex groups was categorized as academic engagement, and a lower proportion as either talking or sharing.

Table 4.3

The Behavior of Boys in Three Interaction Conditions by Year

Type of Interaction	Target Student Behavior						
	Talk	Share	Play	Acad. Perf.	Bother	Look	Other
Year 1							
BB Interaction[a]	35.6%	12.5%	12.8%	9.4%	10.4%	5.1%	14.2%
GB Interaction[b]	29.9	13.2	9.1	11.1	13.3	6.4	16.9
XB Interaction[c]	15.9	7.6	4.1	35.9	10.2	7.0	19.4
Year 2							
BB Interaction[d]	25.4	20.1	9.5	15.1	12.2	1.6	16.1
GB Interaction[e]	26.0	23.3	5.9	13.2	7.8	3.7	20.1
XB Interaction[f]	11.8	9.7	3.5	33.3	11.1	2.8	27.8

[ab] Chi-square (6) = 25.77, $p < .001$

[ac] Chi-square (6) = 210.57, $p < .001$

[de] Chi-square (6) = 11.38, $p < .10$

[df] Chi-square (6) = 45.73, $p < .001$

4.C.2. Girls in same-sex versus cross-sex interaction

In comparison with girls engaged in same-sex interaction (GG), girls engaged in cross-sex interaction (BG) talked less, shared less, played less and bothered more in Year 1 but not in Year 2. In Year 2, there was no difference in bothering between same-sex and cross-sex interaction, and the differences in talking, sharing and playing were less than in Year 1. Mixed-sex group behavior (XG) differed from both cross-sex and same-sex interaction, insofar as a higher proportion of the behavior in both years was characterized as academic engagement, and less as bothering (Table 4.4)

4.C.3. Girls and boys in same sex groups

Comparisons of the behaviors of girls and boys engaged in same-sex interactions were made. Statistically significant differences were

Table 4.4

The Behavior of Girls in Three Interaction Conditions, by Year

Type of Interaction	Target Student Behavior						
	Talk	Share	Play	Acad. Perf.	Bother	Look	Other
Year 1							
GG Interaction[a]	33.8	18.0	12.2	9.7	5.0	5.1	16.4
BG Interaction[b]	29.4	10.1	6.8	12.6	12.9	9.6	18.6
XG Interaction[c]	17.3	10.6	5.3	29.6	6.0	8.5	22.9
Year 2							
GG Interaction[d]	29.7	22.3	6.1	10.1	8.3	5.2	18.3
BG Interaction[e]	17.6	8.5	14.1	8.5	2.5	22.1	
XG Interaction[c]	19.2	13.6	7.1	25.7	2.9	6.4	25.0

[ab] Chi-square (6) = 112.99, $p < .001$

[ac] Chi-square (6) = 128.95, $p < .001$

[de] Chi-square (6) = 7.51, $p < .27$

[df] Chi-square (6) = 29.27, $p < .001$

found for both years (Chi-square (6) = 56.88, $p < .001$ for Year 1; Chi-square (6) = 17.23, $p < .01$ for Year 2). In Year 1, boys bothered more and shared less than girls; in Year 2 boys bothered more and looked at each other less than girls.

4.C.4. Girls and boys in mixed-sex groups

Comparisons of the behaviors of girls in mixed-sex groups (XG) with the behaviors of boys in mixed-sex groups (XB) were made and showed no differences for Year 1 (Chi-square (6) = 8.13, $p < .22$) but statistically significant differences for Year 2 (Chi-square (6) = 15.12, $p < .02$). In Year 2, the differences reflected the overall differences between all-girl interactions and all-boy interactions: girls talked, shared and played more and boys bothered more. In addition, boys in groups were more engaged academically than girls. The direction of these differences were similar for both years, even though they were not statistically significant for both.

4.D. Teacher Response to Student Interaction

As discussed above, another explanation for student antipathy toward cross-sex interaction is that teachers might discourage such

interaction by their responses to it. That is, teachers may respond positively to same-sex interaction and negatively to cross-sex interaction. To explore this hypothesis, we examined differences in teacher responses to same-sex versus cross-sex interaction.

4.D.1. Extent of teacher response to interactions

For this analysis, we excluded "no response" as a valid teacher response. In both years, teachers responded very infrequently to student interactions of any type. Table 4.5 shows that teachers responded most frequently in both years to student academic engagement, bothering, talking and looking.

Table 4.5

Teacher Response to Student Interaction by Type of Behavior

Behavior	% Interactions Receiving Teacher Response by Year	
	Year 1	Year 2
Talking	10.7%	7.8%
Sharing	7.0	4.8
Playing	7.8	5.9
Academic engagement	22.8	22.9
Bothering	15.7	19.2
Looking	4.4	8.2
Other	15.5	15.0

4.D.2. Extent of teacher response to type of interaction

Teachers responded differentially to interaction according to the type of interaction. Table 4.6 indicates that teachers responded more to mixed-sex group interaction--possibly because they were more likely present during group interaction--than they did to same-sex or cross-sex interactions in general. With the exception of girl-girl versus boy-girl interaction in Year 2, there appear to be few differences in the likelihood of teachers responding to same-sex versus mixed-sex interaction.

4.D.3. Type of teacher response to interaction

The next question was whether teachers encouraged or discouraged cross-sex interaction by their responses. For this analysis, we held constant student behavior, since we demonstrated previously that teacher responses were contingent upon student behavior. Because teachers responded to so few student behaviors overall, and cell sized for this analysis were quite small, we collapsed interaction into (1) single-sex and (2) cross-sex interaction and collapsed teacher responses into (1) positive and instructing, (2) neutral and other and (3) managing and negative reactions.

Table 4.6

Teacher Response to Student Interaction, by Type of Interaction

Type of Interaction	% of Interactions Receiving Teacher Response, by Year	
	Year 1	Year 2
Target student boy		
BB Interaction	11.5%	11.6%
GB Interaction	11.4	8.2
XB Interaction	27.3	27.8
Target student girl		
GG Interaction	9.0	5.2
BG Interaction	9.8	10.6
XG Interaction	29.2	21.4

We then conducted an analysis of the resulting contingency tables. Of the fourteen cross-tabulations conducted, two yielded statistically significant differences. In both cases, teachers were observed to provide more positive feedback to cross-sex interaction than to same-sex interaction.

Table 4.7 shows that in Year 1 teachers responded more positively to cross-sex sharing than to same-sex sharing, and more negatively to same-sex sharing than to cross-sex sharing. Teachers also responded more positively to cross-sex whispering than to same-sex whispering and more negatively to same-sex whispering than to cross-sex whispering. In Year 2, no statistically significant differences in teacher responses to cross-sex or same-sex student interaction were found.

4.E. Student Attitudes

Student attitudes—stereotypes about cross-sex classmates, attitudes toward cross-sex interaction, or dispositions towards specific classmates—may be contributing factors to sex segregation in behavior. Presumably, stuents who hold negative stereotypes, attitudes or dispositions regarding their cross-sex classmates are less likely to engage in cross-sex interaction than students who hold more positive attitudes. To investigate the relationships we correlated pretest student attitudes with behaviors.

4.E.1. Gender stereotypes, general

General gender stereotypes were measured by eight items on the student survey of the type "Do you think girls and boys are interested in the same things?" All eight items were combined into a single scale

Table 4.7

Frequency of Teacher Responses to Selected Behaviors,

by Same-sex Versus Cross-sex Interaction

Behavior	Year 1			Year 2		
	Teacher Response			Teacher Response		
	Pos	Neut	Neg	Pos	Neut	Neg
Talking[a]						
Same-sex	7.9	6.0	86.1	20.0	6.7	73.3
Cross-sex	6.8	5.1	88.1	00.0	8.3	91.7
Sharing[b]						
Same-sex	22.9	8.6	68.6	60.0	20.0	20.0
Cross-sex	62.5	12.5	25.0	25.0	37.5	37.5
Playing[c]						
Same-sex	3.0	3.0	93.9	00.0	00.0	100.0
Cross-sex	27.8	16.7	55.6	25.0	00.0	75.0
Academic engage[d]						
Same-sex	80.0	1.8	18.2	80.0	00.0	20.3
Cross-sex	79.3	6.6	14.0	73.7	13.2	13.2
Bothering[e]						
Same-sex	5.4	8.1	86.5	18.2	18.2	63.6
Cross-sex	7.9	2.6	89.5	35.7	7.1	57.1
Looking[f]						
Same-sex	33.3	00.0	66.7	100.0	00.0	00.0
Cross-sex	9.1	00.0	90.9	00.0	00.0	100.0
Other[g]						
Same-sex	35.8	18.5	45.7	70.0	10.0	20.0
Cross-sex	44.7	16.0	39.4	46.9	18.8	34.4

[a] Chi-square (2) = 0.15, n.s. for Year 1; 2.70, n.s. for Year 2

[b] Chi-square (2) = 11.27, $p < .01$ for Year 1; 1.59, n.s. for Year 2

[c] Chi-square (2) = 10.96, $p < .01$ for Year 1; Fisher's exact test (1) = n.s. for Year 2

[d] Chi-square (2) = 2.12, n.s. for Year 1; 2.36, n.s. for Year 2

[e] Chi-square (2) = 1.25, n.s. for Year 1; 1.35, n.s. for Year 2

[f] Fisher's exact test (1) = n.s. for Year 1; n.s. for Year 2

[g] Chi-square (2) = 1.42, n.s. for Year 1; 1.63, n.s. for Year 2

having a possible range of 0-8, the higher score representing a less stereotyped attitude. Male and female classroom means (M = 4.90 and 5.25, respectively) were computed for the 38 classrooms included in both years of the study. The correlations between classroom means of cross-sex interaction and gender stereotypes were statistically insignificant for both boys (r = .283, p > .05) and for girls (r = .182, p > .05).

4.E.2. Attitudes toward cross-sex interaction

Attitudes toward cross-sex interaction were measured by six items on the student survey of the type, "Think of three people in your class that you would choose to do school work with. Are they all boys, all girls or both boys and girls?" For this scale, cross-sex and mixed-sex responses were combined, according to the sex of the respondent, into a scale having a possible range of 0-6, the higher value representing a more positive attitude toward cross-sex interaction. The classroom means for boys was 2.68 and for girls was 2.88. The correlations between classroom means of cross-sex interaction and attitudes toward cross-sex interaction were positive both for boys (r = .467, p < .05) and for girls (r .343, p < .05).

4.E.3. Disposition toward male and female classmates

This measure was computed from the student sociometric completed by each student. A computer-generated list of all children in a student's classroom was given to each child, who was asked to indicate how he or she would feel about working with each other child on a "science class project." Three rating categories were used: (a) would really like to work with, (b) wouldn't mind working with, (c) would mind working with. For each classroom, the mean rating given to male and female classmates by boys and girls were computed; the range for this measure was 1-3 with the higher value the more positive disposition. Mean same-sex ratings (M = 2.20 for boys and 2.35 for girls) were higher than mean cross-sex ratings (M = 1.69 for boys rating girls and 1.62 for girls rating boys).

4.F. Summary

Observation data provide little evidence in the behaviors associated with cross-sex interaction that explain students' overwhelming preference for same-sex interaction:

(1) cross-sex interaction was not consistently less agreeable than same-sex interaction, and

(2) teachers were not more likely to sanction cross-sex interaction than same-sex interaction.

Student attitudes regarding cross-sex interaction were consistently negative, as were ratings of cross-sex classmates. Although correlations between attitudes and behaviors were statistically significant, behavior was not associated with gender stereotypes, suggesting a normative rather than general antipathy.

Chapter Five

Leadership in the Classroom

5.A. Introduction

In the introductory chapter, we presented some evidence regarding the salience of males as leaders in mixed-sex settings. In this chapter we present the results of our study of sex differences in leadership. Four indicators of leadership are used: observed leadership in a classroom activity, self-reported leadership, mean influence over a group task, and within-group rank in influence over a group task.

5.B. Leadership

To gather information on leadership in the classroom, we both observed students and obtained their self-reports of leadership experiences. The observations of students occurred across all periods of the day--including physical education--and the self-reported leadership experiences asked about leader roles in sports, the classroom and in academic activities.

5.B.1. Observed leadership behavior

Leadership behavior was indicated on the observation sheet as part of the coded context. For each observation record, the observer noted who, if anyone, was in charge of the instruction of the student. Observers recorded whether the teacher or another adult was in charge of the student, or the student was working independently, or the student was being tutored by another student, or the student was working independently of the teacher or other adult direction and was in charge of at least one other student. The last code provided the data analyzed in this section. That is, a target student was coded as a leader if he or she was working independently of the teacher and was in charge of at least one other student. For the 743 students in both years for whom both observation and survey data were available, the mean number of observed leadership positions was .17, or less than one-fifth of a leadership position per year. Boys were observed in fewer leadership positions than girls (M = .14 and .19, respectively) but these differences were not statistically significant (F = 0.869, p > .35).

5.B.2. Self-reported leadership

Self-reported leadership was assessed by 14 items on the student survey of the type, "Have you been president of your class during this school year?" The mean number of leadership experiences for all students in both years was 1.82 out of a possible 14 experiences. Boys reported having more leadership experiences than girls in Year 1 (M = 1.95 for boys and 1.67 for girls). These differences were

marginally statistically significant for Year 1 ($\bar{z}$ = 1.96, p = .05) and statistically significant for Year 2 ($\bar{z}$ = 3.71, $p < .01$).

5.C. Influence

To determine the extent to which girls and boys differed in task influence in the classes in the study, we gathered data from ethnically homogenous, mixed-sex, four-person groups composed within classrooms; these data were collected at the beginning of the year and at the end of the year. The task given the students at the beginning of the year was to rank-order 15 items (for example, oxygen, matches, life raft) relative to their importance for survival on the moon; at the end of the year they were asked to rank-order 15 items relative to their importance for survival on the desert (for example, water, a compass, a mirror). Each student ranked the items first individually, and then ranked the items as a group. Influence was operationalized as the difference between the individual's ranking of the items and the group's ranking of the items.

The tasks were adapted from two used with adults, and preliminary results indicated that the students had difficulty with them; relatively few students were able to correctly rank any of the items. We selected five items for each task that at least 25 percent of the students had been able to correctly rank (that is, whose ranking agreed with the expert's rankings, or were only one ranking above or below the expert's). As a further check on these five items, scale reliability coefficients (Cronbach's alpha) were computed; the four items that contributed the most to each scale each year were retained for further analysis. (For the moon survival task, the items were: (1) "food concentrate," (2) "24 boxes of dried milk," (3) "a life raft," (4) "5 gallons of water" [Year 1], or "signal flares" [Year 2]. For the desert survival task, the items were: (1) "a flashlight," (2) "a parachute," (3) "2 quarts of 180-proof vodka," and (4) "a quart of water per person" [Year 1] and "a first aid kit" [Year 2]. These were <u>not</u> the items necessary for survival.) The person's whose individual ranking of these four items most closely approximated the group's ranking was considered to have the greatest influence over the group activity.

5.C.1 Mean influence

For the 608 students in both years for whom pretest data were available, the mean influence score was 9.62. Boys were more influential than girls, on the average (M = 9.12 for boys and 10.12 for girls; a lower score indicates greater influence). Analyses of variance indicated that while these differences were statistically significant for the population as a whole (F = 3.41, $p < .07$), they were not replicated for either year taken separately ($F(1,348) = 2.00$, $p > .15$ for Year 1; $F(1,226) = 1.81$, $p > .17$ for Year 2). In both years, however, boys were approximately one point more influential than girls.

5.C.2. Rank order of influence

Because an analysis of mean differences in influence may mask within-grop differences (Lockheed, Harris & Nemceff, 1983), we also conducted an analysis of sex differences in influence rank. Within each group, group members were rank-ordered by influence; the sex of the group member was also noted. Table 5.1 presents the percentage of males and females holding ranks 1-4 for the 99 groups from Year 1 and the 74 groups from Year 2. In both years, a higher proportion of the most influential group members were male than were female. This difference was statistically significant for Year 1 (Chi-square (3) = 12.48, $p < .01$) but not for Year 2 (Chi-square (3) = 5.24, $p > .10$)

Table 5.1

Proportion of Each Rank Held by Male and Female Group Members by Year

	Year 1 (N = 99 groups)		Year 2 (N = 74 groups)	
Rank	Males	Females	Males	Females
1	56%	44%	62%	38%
2	62%	38%	38%	62%
3	41%	59%	55%	45%
4	43%	57%	45%	55%

5.C.3. Perceived leader of group

For the Year 2 sample only we obtained information on which person the group members perceived to be the group leader. In 41 (56%) of the 73 groups for which these data were available, the group designated a boy as leader.

5.D. Summary

The analyses in this chapter indicate that boys have more leadership experiences and are more influential than the girls in their classrooms. The only indicator that did not show greater male leadership was our direct observation of academic leadership. Since girls may have an academic advantage over boys in the classroom and are certainly more willing to help boys than the converse (Webb & Kenderski, in press), the nature of the academic tasks that we observed may have "equated" girls with boys and equalized their influence (Webster & Driscoll, 1978; Pugh & Wahrman, 1983).

Chapter Six

Intervention Implementation and Effects

6.A. Intervention

Among the multiple goals of the study, the implementation of an intervention, designed to modify the interaction patterns in the classroom, was critical. As reviewed in Chapter One, gender related differences in the interactions between teachers and students, and between student and students are amply documented. Analyses of classroom interactions reveal consistent patterns of inequity that reflect gender-related differences found in the society at large, which tend to favor males in access to resources and attainment of status in most walks of life.

Any attempt to change the prevailing patterns of classroom interactions in the direction of greater equity must, however, deal with the fact that the relationship of particular interaction patterns to outcomes of schooling is, as yet, poorly understood. Consequently, the choice and focus of any intervention is of strategic significance, necessarily made with partial knowledge. Another set of concerns relate to the means deployed to bring about desired changes in the interactions of teachers and students. Previous interventions have tended to center on prevailing sex-stereotypes, seeking to weaken the beliefs and attendent expressions of stereotypic attributions (Guttentag & Bray, 1975). Through the development of curriculum materials, as well as through more direct strategies of influence, enhanced awareness of stereotypic thought and behavior were cultivated, in the belief that greater awareness would make the incorporation of counter-evidence more likely, eroding thereby the basis for maintaining stereotypes (Simpson, 1978).

On the whole, the actual classroom processes that may generate, reinforce, or maintain differential patterns of interactions have received little attention. One exception to this general statement is the model that guided the design of the intervention for the present study: The CARE: Curriculum and Research for Equity teacher training manual (Lockheed, Finkelstein & Harris, 1979) developed at ETS. The CARE manual, which includes resources aimed at enhancing awareness, specifically addresses classroom processes related to cross-sex interaction and leadership in six two-hour workshops. The manual includes activities to be conducted in the workshops; research activities for teachers to undertake in their own classrooms; curriculum units in mathematics, language arts, social studies, science and the affective domain; assessment materials and other references. The intent of these materials is to reduce stereotypic behavior and thought and to directly influence teachers to increase opportunities for cross-sex interaction in the classroom and to promote female leadership. The effectiveness of the strategies suggested in the CARE manual in changing children's gender stereotypes, occupational gender stereotypes, and attitudes

toward cross-sex interaction has been documented (Lockheed, Finkelstein & Harris, 1979). The CARE manual served as the core plan for the intervention and was selectively adapted for presentation at the two sites.

6.A.1. Year One

The major intervention activity was a two-day training workshop at each site, in February for Northern, and early April for Montevista. The original design called for half the teachers at each site to participate in the intervention. Mainly due to scheduling constraints, five teachers participated in the workshop for Northern, and eight teachers in Montevista.

Although the workshops varied somewhat in specific detail at the two sites, the general intent, overall plan and spirit of the workshops were the same at both. Four of the ETS staff were present at each workshop, three of them attended both. The sequence of activities took the following form.

The first morning at each site involved the teachers in an in-depth interview with an ETS staff member. The interviews were intended to gain information about each teacher's background, working environment, classroom setting, and his/her gender-related classroom practices and perceptions. Although designed primarily as a data-gathering procedure, the interviews also became part of the intervention; the experience of being asked to reflect on gender-related concerns was expected to have some impact on these very perceptions.

The individual interviews were followed by group sessions, involving all the teachers and the ETS staff at each site. The session began by a review of the rationale and design of the study, and a videotaped presentation of findings from previous research on sex equity. Following a brief discussion, the group reviewed the completed Classroom Environment Research Sheets which the teachers brought to the session. The sheet contained descriptions of the pictures displayed in their classrooms and instances of cross-sex interaction and female leadership they may depict. The session then moved on to the main activity, that of analyzing the textbooks that the teachers were currently using in their classrooms. The reading and social studies texts were scrutinized systematically to reveal the kind of representations they contained of the genders.

This activity proved to have made perhaps the greatest impact on the teachers. The textbooks were found to be male dominated, showing not only a predominance of boys, but also showing boys as engaged in more active, varied and higher status activities, and displaying a wider range of competencies. The teachers, each of whom had been using the textbooks in question for at least three years, were impressed by their own lack of awareness of the bias inherent in the texts.

Subsequent sessions were devoted to the topics of cross-sex interaction and female leadership in the classroom. Each of the topics was introduced by offering both pedagogical and equity-based rationales for their promotion; specific strategies and techniques for providing students with more opportunities to work cooperatively across gender lines, and increasing girls' opportunities for the exercise of leadership were presented and discussed. The level of discourse in these workshop sessions was classroom oriented, the teachers being encouraged to weigh and assess the value and feasibility of the strategies and procedures in terms of their own teaching environment. Teachers were also encouraged to suggest and invent other means for bringing about these goals.

The last session of each workshop was devoted to drawing up plans by the teachers for the approaches and activities they would use to modify the interactions in their classrooms. Each teacher was provided a copy of the CARE manual to use as a resource.

Following the workshop, the teachers were contacted by phone and visited in their classroom by an ETS staff member. Toward the end of the school year, each of the participating teachers were interviewed again, this time with an emphasis on their perception of the intervention workshop and any change in their classroom practice that resulted from it.

6.A.2. Year Two

In both sites, a one-day "refresher" workshop with teachers in the experimental condition was held immediately prior to the opening of the school. The same two ETS staff members were present at each workshop. Summary data from each teacher's 1980-81 homeroom class were shared with the teachers, and teachers were asked to agree to two organizational changes for their classrooms in 1981-82: (1) to assign seats to students on the first day of school according to some random strategy, such as numbering the desks and having the students draw numbers out of a hat and then sitting at the designated desk, and (2) to establish a procedure whereby leadership roles were rotated throughout the members of the class. Following this initial workshop, notices were sent to the teachers in the experimental condition to remind them to use strategies suggested in the workshops:

1. Ideas for randomly grouping students.

2. Ideas for encouraging competent girls to demonstrate their competence.

3. Reminder about Women's History Week and studying famous women.

4. Assessing student willingness to work in cross-sex groups.

5. Ideas for increasing student awareness of their leadership roles.

A second set of ten-hour workshops were also held in late February and early March, 1982 for the teachers assigned to the control condition and for other interested teachers. Because these workshops were implemented differently in the two districts, they will be discussed separately. Both workshops drew heavily from CARE (Lockheed, Harris & Finkelstein, 1979).

In Northern, the workshop was held on a Friday afternoon and all day Saturday the last weekend in February. The workshop was led by two ETS researchers and was cosponsored by ETS and the district in-service training program. It was open to all teachers in the district, who paid a $20 registration fee for materials; project teachers were exempt from the fee. A total of 26 teachers attended the workshop, including 4 teachers in the control condition and 3 teachers in the experimental condition. Teachers attending the workshop received in-service credit award by the district.

The workshop in Northern began with a description of the project and an overview of the workshop. After completing an awareness exercise, participants analyzed textbooks being considered for district adoption; stories and illustrations were reviewed for gender bias. The second day, strategies for encouraging cooperation and leadership in the class were reviewed and practiced.

In Montevista the workshop was held on a Friday afternoon and evening and a Saturday morning during the first week in March, 1982. The workshop was led by two ETS researchers--one of whom had led the workshop in Northern--and was co-sponsored by ETS and the county Sex Desegregation Training Institute (SDTI). The workshop was open to the SDTI Advanced Trainer group on Friday and to all county teachers on Saturday; personal letters of invitation were sent to project teachers in the control condition in Montevista offering a $30 stipend to facilitate their attendance. A total of 13 Advanced Trainers attended Friday and 15 trainers and teachers attended Saturday, but no project teachers attended this workshop. The workshop differed from that offered in Northern, insofar as substantially less time was spent on textbook analysis and more time was spent on practice teaching of cooperative strategies.

All teachers assigned to the experimental condition in both Northern and Montevista received 15 hours training in 1980-81. All teachers in the experimental condition who continued to participate in the project in 1981-82 received an additional 7 hours training. Beyond that, four teachers in the experimental condition in Northern received 10 more hours of training. The total number of hours of training received by teachers in this project is summarized in Table 6.1.

The total hours of training received by the teachers assigned to the experimental condition for both years compares favorably to the number of hours of instruction typically offered in a semester-long course. It is many more hours than generally provided by inservice courses, which tend to be shorter, from 2-6 hours in length.

Table 6.1

Mean Total Hours of Training Received by Project Teachers

	1980-81	1981-82
Montevista		
Experimental	15.0	22.0
Control	0.0	0.0
Northern		
Experimental	15.0	29.5
Control	0.0	10.0

6.B. Evidence of Implementation

The implementation of the intervention entailed two specific classroom changes: (1) increasing the frequency with which students were assigned leadership positions, and (2) increasing the frequency with which students were placed by the teacher in small task-oriented groups. Both observed behavior and student self reports were obtained to determine the extent of implementation. For this analysis, two data sets were used. First the observation records of all target students for both years were aggregated; the total number of students included in this analysis was 743. Second, students who had both pre- and post-test survey data were identified; the total number of students included in this analysis was 1,060.

6.B.1. Leadership behavior

Leadership behavior was coded by the observers as part of the context code on the observation sheets. For each target student, the number of observed leadership experiences was summed. For all target students in both years, the mean leadership experience was 0.17, or less than 1/5 of an experience. An analysis of covariance controlling for the number of observation records gathered for each student showed statistically significant main effects for grade ($F = 18.88$, $p < .001$) and experimental condition ($F = 10.27$, $p < .001$), and grade by experimental condition interaction effects ($F = 11.04$; $p < .001$). No effects for sex were observed.

As Table 6.2 indicates, fifth-grade students in the experimental condition were much more often observed to be tutoring or in charge of another student than were students in any other grade or condition. From this we conclude that the experimental treatment was implemented, particularly in fifth-grade classes.

Table 6.2

Mean Observed and Reported Posttest Leadership and Small-group Experiences of Students

	Control		Experimental	
	4th	5th	4th	5th
Observed experiences				
N =	(169)	(219)	(217)	(138)
Leadership	.04	.12	.09	.51
Small group work	2.18	2.16	2.71	3.07
Self-reported experiences				
N =	(250)	(268)	(153)	(389)
Leadership	2.29	2.73	2.36	3.71
Small group work	1.14	0.66	1.17	1.27

6.B.2. Leadership self reports

Leadership experiences were also assessed through 14 questions on the survey that asked about general leadership experiences and for each subject area, whether the student had been in charge of a group project in that subject over the preceeding two weeks. For all students in both years, the mean number of self-reported leadership experiences was 1.82 for the pretest and 2.63 for the posttest. An analysis of covariance, holding constant pretest leadership experiences, showed statistically significant main effects for sex ($F = 3.02$, $p < .10$), grade ($F = 42.12$, $p < .001$), year ($F = 4.72$, $p < .05$) and experimental condition ($F = 9.66$, $p < .002$). Several interaction effects were found, including a grade by experimental condition interaction ($F = 13.48$, $p < .001$). Once again, the fifth-grade students in the experimental condition showed higher levels of leadership experiences.

6.B.3 Group behavior

Group behavior was indicated on the observation sheet as part of the coded context. For each observation record, the observer noted the working relationship of the student being observed to others in the class. Observers recorded whether the target student was working by himself or herself, or the students were working together as a class unit, or the student was working in a group in which students were

helping each other and sharing information. The group code provided the data analyzed in this section.

For each target student, the number of observed group experiences was summed across all observation records. For all target students in both years, the mean number of group experiences was 2.50 (Table 6.2). An analysis of covariance, controlling for the total number of observation records gathered for the particular target student, showed modest main effects for experimental condition ($F = 2.75$, $p < .10$) and modest grade by experimental condition interaction effects ($F = 3.78$, $p < .06$). Again, fifth-grade students in the experimental condition experienced more group experiences than students in fourth grade or than students in the control condition.

6.B.4. Self reports of group experiences

Group experiences were also assessed through 14 questions on the survey that asked, for each subject area, whether the teacher of that subject had asked the student to work at the same table on a project with other students during the previous week. For all students in both years, the mean frequency of cooperative group experiences reported by students was 1.05. An analysis of covariance, holding constant pretest reported cooperative group experiences, showed statistically significant main effects for experimental condition ($F = 6.73$, $p < .01$), site ($F = 60.24$, $p < .001$) and year ($F = 8.79$, $p < .01$). No main effect for sex was observed. No grade by experimental condition interaction was found, although Table 6.2 indicates that fourth grade students in the control condition experienced fewer cooperative group experiences than did students in fourth grade or fifth grade students in the control condition.

6.B.5. Summary of intervention implementation

From both observation and student report it is evident that the intervention efforts had statistically significant effects on changing the amount of leadership and group collaboration that students--particularly fifth-grade students--in the experimental classrooms experienced. The overall level of these experiences was quite low, however. Few students reported experiencing any leadership or group collaboration in any classrooms, and the observation records support their reports. Major effects were found, moreover, for students in fifth-grade experimental classrooms, or approximately one-quarter of the students.

6.C. Classroom Level Analysis

A major purpose of the intervention was to change the structure of the classroom in three ways: (1) to reduce sex segregation in student choices of work partners, (2), to increase the observed cross-sex interaction among classmates, and (3) to equalize the influence of boys and girls over task-related decisions in mixed-sex groups. In addition, the intervention was designed to change classroom norms regarding gender and gender-stereotypes.

In conducting the classroom-level analysis, we first attempted to analyze each year separately (Lockheed & Harris, in press), but found that the sample size for Year 2 was two small (N = 18 for survey and sociometric data; N = 9 for observation data) for the desired analyses. We then decided to analyze all classrooms simultaneously, and to include in the analysis an indicator for the year in which data were collected. We recognize that the classrooms of the two years do not constitute entirely independent samples, since some of the teachers and some of the students are the same, but--since we were interested in classroom social structure--we considered the social structure of each of the classrooms to be uniquely determined. No classroom was carried over in its entirety from Year 1 to Year 2, and, in fact, very few students were assigned to the same homeroom teacher for two consecutive years. Moreover, since all fifth-graders in the Year 1 classrooms automatically left the study for Year 2, and new fourth-graders entered the study in Year 2, substantial student turnover was inevitable.

6.C.1. Sex segregation

Sex segregation was defined as the difference between the mean same-sex rating and the mean cross-sex rating given by students to their classmates. Each student rated all other students in his or her class according to the following criteria: "Someone I would like to work with" on a science project, "Someone I wouldn't mind working with," or "Someone I would mind working with." The rating categories were coded 3, 2 and 1, respectively.

The mean same-sex and cross-sex rating given to classmates demonstrates the strength of the sex segregation in place at the beginning of the school year in both experimental and control classrooms (Figure 6.1). Both boys' ratings of boys and girls' ratings of girls were substantially more positive than boys' ratings of girls or girls' ratings of boys. The differences in ratings were statistically significant in all cases. Specifically, in control classrooms, same-sex ratings were significantly higher than cross-sex ratings for girls (M = 2.33 and 1.69, respectively; t = 12.34, $p < .01$) and for boys (M = 2.17 and 1.59, respectively; t = 11.96, $p < .01$). Similarly, in experimental classrooms, both girls and boys gave higher same-sex ratings than cross-sex ratings (for girls: M = 2.37 and 1.70, respectively; t = 12.53, $p < .01$; for boys: M = 2.24 and 1.66, respectively; t = 10.36, $p < .01$). By the end of the year, these differences had not changed (Figure 6.2).

To test for experimental effects on these ratings, four separate multiple regression analyses were conducted, one for each type of rating. The results of these analyses are presented in Table 6.3, which shows the remarkable stability of cross-sex ratings over time: partial correlations of .80 for girls and .73 for boys between pre-test and post-test, controlling for experimental effect. Assignment of the classroom to the experimental treatment did not, however, substantially increase or decrease either cross-sex or same-sex ratings.

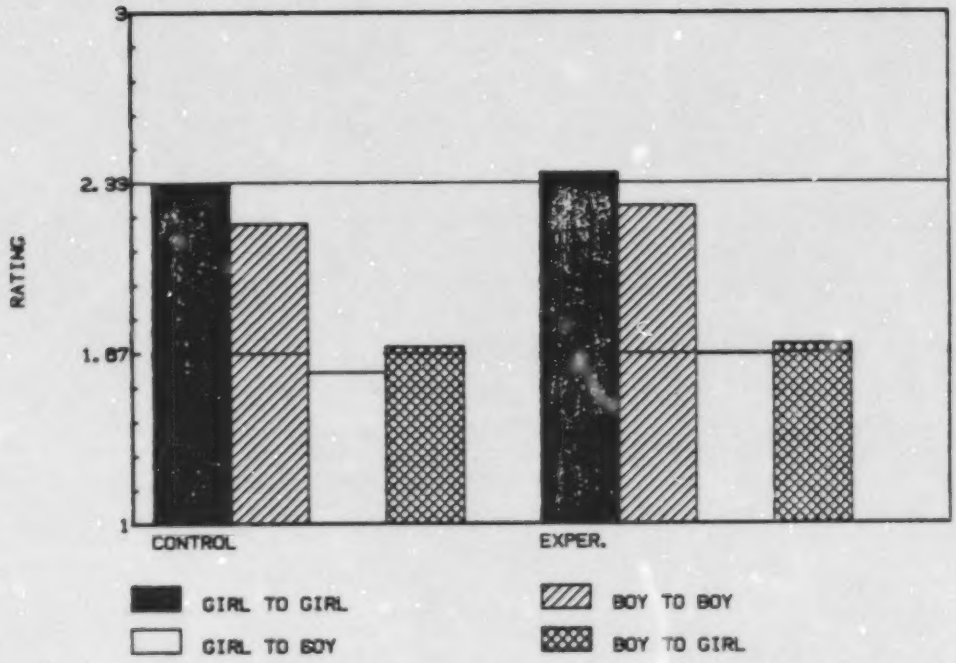


Figure 6.1 Mean same-sex and cross-sex ratings given to classmates at pretest, by experimental condition.

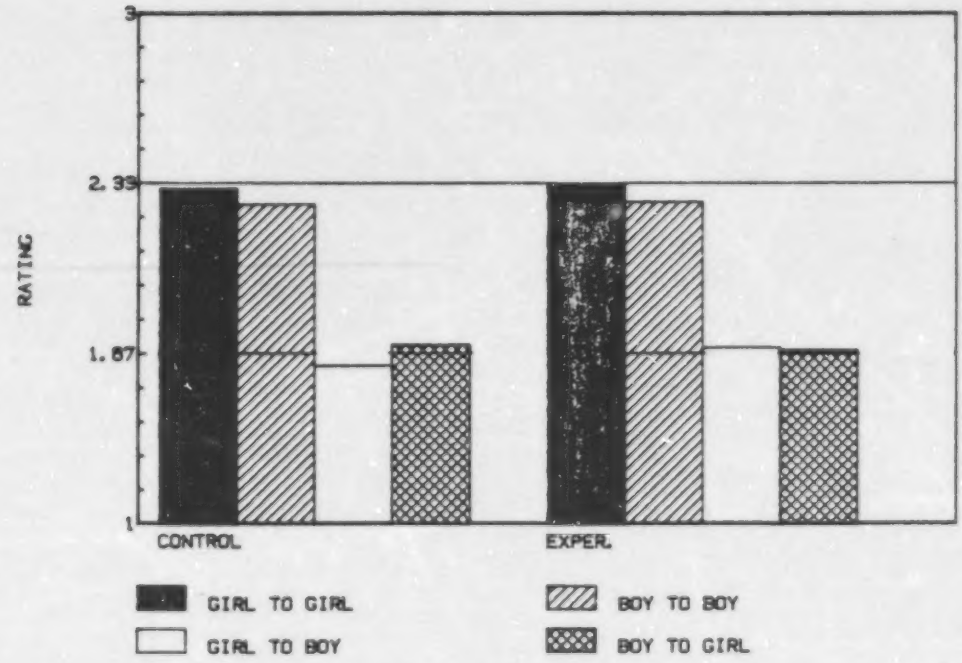


Figure 6.2 Mean same-sex and cross-sex ratings given to classmates at posttest, by experimental condition.

:DY AVAILABLE

To test for treatment effects on sex segregation specifically, a measure of segregation was developed from the same- and cross-sex ratings. For each classroom the mean cross-sex ratings of boys and of girls were summed and subtracted from the sum of the mean same-sex ratings of boys and of girls. Higher values of the resulting measure, which indicated a greater discrepancy between the same-sex and the cross-sex ratings, indicated greater segregation. Experimental effects

Table 6.3

Experimental Treatment Effects on Posttest Same-sex (SS) and Cross-sex (CS) Ratings by Sex of Rater, Holding Constant Pretest Rating. Numbers are Standardized Regression Coefficients.

Posttest:	(1) SS-G	(2) CS-G	(3) SS-B	(4) CS-B
Pretest:				
SS-G	.611***			
CS-G		.803***		
SS-B			.428**	
CS-B				.731***
EXPCOND	-.029	-.068	-.071	.050
R^2	.368	.646	.174	.553
$\bar{R}^2$	.332	.626	.127	.527
F	10.22	31.97	3.69	21.67

*** $p < .001$

** $p < .01$

* $p < .05$

of sex segregation, predicted to be negative, were assessed through a multiple regression analysis, in which the post-test segregation measure was the dependent variable and the pretest sex-segregation measure and and indicator of the experimental condition were the independent variables (Table 6.4). Although the sign of the coefficient for experimental condition was negative, as predicted, the size of the

Table 6.4

Experimental Treatment Effects on Posttest Sex Segregation, Holding Constant Pretest Sex Segregation. Numbers are Standardized Regression Coefficients.

Independent variables	Posttest sex segregation
Sex segregation pretest	.668***
EXPCON	-.074
R^2	.447
$\hat{R}^2$	.415
F	14.147

*** $p < .001$

coefficient was not statistically significant. We also conducted two other analyses, one in which residual change was the dependent variable and one that included indicators for year, site, grade, percent female in the classroom and percent of instructional contexts that were groups; neither yielded results that were different from the simpler formulation.

6.C.2. Cross-sex interaction

A second objective of the intervention was to increase the proportion of cross-sex versus same-sex interaction in the classroom. Cross-sex interaction was operationalized as the sum of cross-sex behaviors directed toward target students and cross-sex responses to target students' behaviors; same-sex interaction was comparably operationalized. The proportion of same-sex to cross-sex interaction in control and experimental classrooms is presented in Figure 6.3. Overall, a higher proportion of peer interactions in classrooms in the experimental condition, in comparison with the control classrooms, were cross-sex interactions. In fact the same-sex to cross-sex ratio to control classrooms (2:1) was similar to that reported in several previous studies. The near parity of same-sex to cross-sex interaction in classrooms in the experimental condition, is unprecedented.

To test for significant differences in cross-sex interaction between control and experimental classes, we conducted multiple regression analyses in which a number of factors that might have contributed to the observed differences in means were statistically controlled. Specifically, we controlled for such exogenous factors as

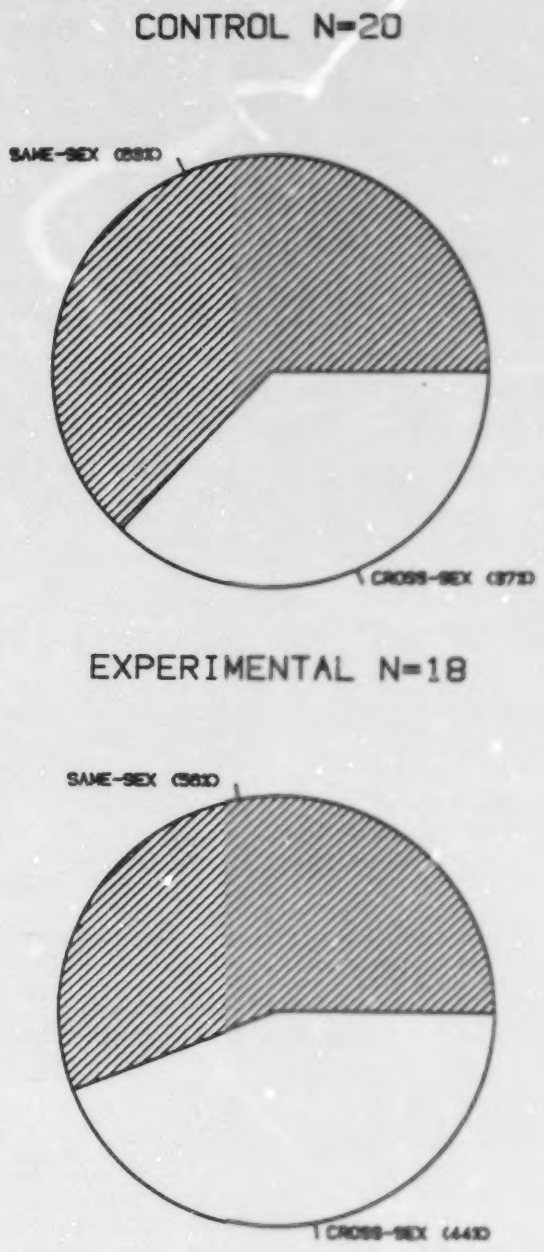


Figure 6.3 Proportion of same-sex to cross-sex interaction in control and experimental classrooms.

site, grade and year, and for classroom structural factors such as the proportion of students who were girls and the extent to which the teacher utilized small, mixed-sex groups as an instructional strategy.

The results of these regressions are presented in Table 6.5. More cross-sex interaction was observed in Montevista than in Northern. Neither the percentage of girls in the classroom nor classroom grouping practices were positively associated with cross-sex interaction. After controlling for these exogenous and structural factors, assignment to the experimental condition remained positively and statistically significantly related to cross-sex interaction ($t = 2.89$; $p < .01$) ; the experimental treatment contributed 10 % to the explained variance in cross-sex interaction.

Table 6.5

Intervention Effects on Cross-sex Interaction in 4th- and 5th-grade Classrooms. Numbers are Standardized Regression Coefficients.

Independent Variables	(1)	(2)	(3)
In Year 1	.003	.043	.057
In Grade 4	.233	.225	.182*
Site	.652***	.695***	.616***
PCTFEM		.204*	.145
PCTCXTX		.030	.010
EXPCON			.326***
R^2	.51	.55	.64
$\hat{R}^2$	.47	.48	.58
F	11.91	7.94	9.54

*** $p < .01$

** $p < .05$

* $p < .10$

6.C.3 Influence

Sex differences in interaction in small, mixed-sex task groups from ongoing classrooms are well documented (Lockheed & Harris, 1982;

Webb & Kenderski, in press). One important difference is the relative influence of girls and boys vis-a-vis the task; frequently, boys are more influential than girls and generally they are perceived by themselves and by others to be more influential. One element of the intervention was to identify and reinforce student leaders, particularly girl leaders. The purpose of this part of the intervention was to increase the perceived legitimacy of girl leaders, and to improve the chances of girls to be influential over group decisions. In this analysis, influence is defined as in Chapter Five: the deviation between individual and group rankings of four items needed for survival on the moon or the desert.

The mean deviations between group and individual rankings on the pretest are presented by sex and experimental condition in Table 6.6; a lower score represents greater influence. Sex differences in influence were found in White, Black, Hispanic and Asian groups, and in both the

Table 6.6

Pretest Group Influence Within Group Type,
by Sex and Experimental Condition

	Control		Experimental	
Group Type	Girls	Boys	Girls	Boys
White (N = 496)	9.07	8.51	10.17	8.94
Black (N = 44)	13.13	12.88	16.00	14.71
Hispanic (N = 24)	11.50	10.75	14.25	7.00
Asian (N = 44)	9.38	10.75	10.50	7.36

control and experimental classrooms. A three-way analysis of variance showed significant sex ($F = 3.41$, $p < .10$) and group type ($F = 8.67$, $p < .001$) main effects. There were no pretest differences between groups from control and experimental classrooms ($F = 1.617$, $p = .20$) and no interaction effects were observed. Boys were more influential than girls throughout, and there was greater influence exercised by children in White and Asian groups than in Black and Hispanic group.

To test for experimental effects, similar analyses were conducted on the post-test measure: the ranking of 15 items needed for survival on the desert, four items of which were selected for use. The mean influence, by sex and experimental condition within group type, is presented in Table 6.7; a three-way analysis of variance revealed no statistically significant main effects or interaction effects for sex, experimental condition or group type. A comparison of Table 6.6 with Table 6.7 shows that the overall influence of the girls in both the experimental and control classrooms increased substantially from the pretest to the posttest.

Table 6.7

Posttest Group Influence by Sex Within Group
in Experimental Condition

Group type	Control		Experimental	
	Girls	Boys	Girls	Boys
White (N = 444)	8.89	9.37	9.42	8.8L
Black (N = 48)	8.00	8.25	10.56	9.13
Hispanic (N = 36)	9.25	8.63	7.50	9.80
Asian (N = 52)	10.13	11.50	10.72	9.56

6.C.4 Other intervention effects

A fourth objective of the intervention was to reduce gender stereotypes, to improve attitudes towards cross-sex cooperation, and to improve student perceptions of themselves as leaders and problem solvers.

Individual pretest means for six student attitudes and perceptions--perceptions of the competence of girls versus boys (STUCOMP), attitudes towards girls versus boys as leaders (ATTLEAD), gender stereotypes (STEREO), attitudes toward cross-sex interaction (ATTCSI), self perceptions of leadership abilities (SLFLEAD) and self perception of problem-solving abilities (PROBSOL)--were computed for each year within grade and experimental condition (Table 6.8). Sex differences were found for STUCOMP and ATTLEAD for both grades, both conditions and both years: boys viewed boys as more competent as and better leaders than girls, and girls viewed girls as more competent and as better leaders than boys. That is, a strong same sex perception of general competence and leadership abilities was found.

Gender stereotypes were held equally for both boys and girls for all but Year 1 fourth grade girls ($\underline{M}$ = 5.05) and boys ($\underline{M}$ = 4.63) in the experimental group and Year 1 fifth-grade girls ($\underline{M}$ = 5.32) and boys ($\underline{M}$ = 4.71) in the control group ($\underline{t}$ = 1.89, $\underline{p} < .10$ and $\underline{t}$ = 3.10, $\underline{p} < .01$, respectively). On a scale of 0-8, where 0 represented sex-stereotyped responses and 8 represented sex-egalitarian responses, these means indicate a fairly neutral position on the stereotyped-egalitarian continuum.

On the same-sex to cross-sex interaction choice continum (ATTCSI), no sex differences were observed for Year 1 or for Year 2 fifth-grade students, but sex differences in the Year 2 fourth grade were found. In the control condition, boys ($\underline{M}$ = 2.96) had a more positive attitude toward cross-sex interaction than girls ($\underline{M}$ = 2.45); this difference was

Table 6.8

Individual Pretest Means on Six Attitude and Self-perception Measures, by Grade, Experimental Condition, and Year

	4th Grade						5th Grade					
	Cont.			Exp.			Cont.			Exp.		
	Boy	Girl	t	Boy	Girl	t	Boy	Girl	t	Boy	Girl	t
Year 1												
STUCOMP	2.93	5.48	8.11[a]	3.10	5.84	10.46[a]	3.69	5.67	7.05[a]	3.10	5.65	6.46[a]
ATTLEAD	1.39	4.87	15.46[a]	1.53	4.34	14.04[a]	1.56	4.16	13.94[a]	1.77	4.12	8.33[a]
ATTCOOP	2.85	2.50	1.31	2.75	3.04	1.44	2.64	2.70	0.29	2.76	3.09	0.92
STEREO	4.77	4.87	0.35	4.63	5.03	1.89[d]	4.71	5.32	3.10[b]	5.56	5.27	0.91
SLFLEAD	5.58	5.04	1.65[d]	5.43	5.05	1.35	5.88	5.70	0.56	5.86	5.72	0.25
PROBSOL	8.09	8.19	0.27	8.17	8.26	0.29	8.94	8.56	1.13	9.20	8.73	0.87
Year 2												
STUCOMP	3.26	5.95	7.52[a]	2.77	4.97	8.03[a]	2.42	5.44	8.04[a]	3.68	5.85	4.81[a]
ATTLEAD	2.20	3.91	5.91[a]	2.35	3.81	7.04[a]	2.34	4.13	4.83[a]	3.02	3.85	2.03[c]
ATTCOOP	2.96	2.45	1.70[d]	2.71	3.37	2.86[b]	2.45	2.83	1.08	2.75	3.26	1.14
STEREO	5.45	4.98	1.34	5.10	5.45	1.54	4.77	5.15	1.12	5.75	5.67	0.17
SLFLEAD	6.36	4.72	3.68[a]	6.11	5.61	1.62	6.08	6.59	0.88	6.28	5.93	0.59
PROBSOL	8.64	8.11	1.25	9.07	8.96	0.31	8.51	8.92	0.78	8.90	9.00	0.14

[a] $p < .001$

[b] $p < .01$

[c] $p < .05$

[d] $p < .10$

modestly statistically significant (t = 1.70, p < .10). In the experimental condition, girls (M = 3.37) had a substantially more favorable attitude toward cross-sex interaction than did boys (M = 2.71); this difference was statistically significant (t = 2.86, p < .01). In general, however, all students reported preferring to work in same-sex groups over cross-sex groups.

With the exception of fourth-grade students in the control condition, we saw no sex differences in student self perceptions of either their problem-solving abilities or their leadership abilities. In both years boys in the fourth-grade control condition (M = 5.58 and 6.36, for Year 1 and Year 2, respectively) perceived themselves to be better leaders than did the girls (M = 5.04 and 4.72, for Year 1 and Year 2, respectively). These differences were modestly significant in Year 1 (t = 1.65, p < .10) and greater in Year 2 (t = 3.68, p < 001).

To determine the experimental effects on these measures, classroom scores for all variables were computed; posttest scores were regressed against experimental condition, statistically controlling for pretest score year, site, grade, percent female and percent of classroom instructional contexts that were small, mixed-sex groups. Separate analyses were conducted for female classroom means and for male classroom means. A summary of these analyses is presented in Table 6.9a & b. The experimental treatment was effective in improving only boys' attitudes about working cooperatively with girls; because multiple (12) comparisons were made, it is possible that this was merely an artifact.

6.C.5. Summary of classroom level analysis

The effect of the intervention, as indicated by an analysis of classroom means, appears to be mixed. These results are summarized as follows:

(1) The intervention was not successful in changing cross-sex ratings of classmates. Although there was some movement in the desired direction in the experimental classrooms, the differences between same-sex and cross-sex ratings remained large in both experimental and control classrooms.

(2) Observed cross-sex interaction in the experimental classrooms was more frequent than in the control classrooms; this difference was statistically significant.

(3) Sex differences in influence, observed at the pretest, were not evident at the posttest, but no sex by experimental condition interaction was found for either the pretest or the posttest, suggesting that the experimental condition was not responsible for this change in influence.

(4) The experimental treatment was successful in improving boys' attitudes towards cooperating with girls, but had no effect on any other student attitude or self perception.

Table 6.9a

Intervention effects on boys' attitudes, perceptions, and self reports in 4th and 5th grade classrooms (N = 38), controlling for pretest, exogenous and classroom structural variables. The dependent variable is the male classroom mean on the posttest. The numbers are standardized regression coefficients.

Independent variables	STUCOMP	ATTLEAD	ATTCOOP	LEADEXP	COOPEXP	STEREO	SLFLEAD	PROBSOL
Pretest	.707***	.577***	.742***	.401*	.516**	.478**	.564***	.382**
Year 1	-.039	-.116	.134	.031	-.013	-.002	-.024	-.058
Grade 4	-.108	-.063	-.253*	-.325*	-.167	-.150	-.144	-.102
Site	.099	.240	-.080	.010	.284	.358*	.039	-.137
PCTFEM	.198**	-.100	-.014	.132	.031	-.098	-.295**	-.261
PTCXTX	-.016	.203	.059	.418*	.037	.389**	.249*	.316*
EXPCON	-.001	-.043	.277*	.051	.138	-.021	-.073	.040
R^2	.675	.601	.574	.445	.495	.586	.637	.498
$\hat{R}^2$	.599	.509	.474	.316	.377	.489	.552	.381
F	8.92	6.48	5.77	3.44	4.20	6.07	7.52	4.25

*** $p < .001$

** $p < .01$

* $p < .05$

Table 6.9b

Intervention effects on girls' attitudes, perceptions and self reports in 4th and 5th grade classrooms (N = 38), controlling for pretext, exogenous and structural variables. The dependent variable is the female classroom mean on the posttest. The numbers are standardized regression coefficients.

Independent variables	STUCOMP	ATTLEAD	ATTCOOP	LEADEXP	COOPEXP	STEREO	SLFLEAD	PROBSOL
Pretest	.773***	.447**	.698***	.587***	.526***	.298	.929***	.681***
Year 1	-.016	.092	-.028	-.222	-.081	-.101	.043	.102
Grade 4	-.037	.298	.050	-.208	.043	-.312*	.090	-.151
Site	-.196	-.218	.094	.130	.323*	.303	.159	.145
PCTFEM	.289**	.037	.002	-.038	.065	.082	-.048	.025
PTCXTX	-.114	.055	-.032	.263	.143	.126	-.052	.052
EXPCON	.155	-.075	.007	.047	.152	.168	.016	-.128
R^2	.682	.445	.576	.506	.622	.466	.695	.489
$\bar{R}^2$	.607	.316	.478	.391	.534	.342	.624	.370
F	9.19	3.44	5.84	4.39	7.06	3.75	9.77	4.10

*** $p < .001$

** $p < .01$

* $p < .05$

Chapter Seven

Sex Equity in Classroom Intraction: Summary

At the outset of this project, we sought to understand the nature and determinants of sex segregation and male preeminance in elementary classrooms. From our reading of the literature, we expected to find that the classroom teacher played a major role in creating and maintaining inequities. Our data from 38 classrooms do not support this assumption. If anything, we found that the classroom teachers bent over backwards to be fair.

What we did find to be the major determinants of inequities were the children, themselves. But even here our findings were not quite what we anticipated. As expected, we found a strong same-sex preference, but--unexpectedly--this preference was not expressed in behavior to the degree expected. That is, despite an overwhelming strong same-sex preference on the part of both girls and boys, the students actually engaged in cross-sex interaction quite frequently, and with no observably consistent differences from their same-sex interaction. Before speculating further on these interesting results, we will summarize the findings from Chapters 3-6 of the report.

In Chapter Three we presented results from classroom observations demonstrating that:

1. Boys and girls exhibit different behavior in classroom situations, with boys exhibiting more behavior judged as inappropriate or coded as disruptive.

2. In the first year of the study, teachers called on girls more than boys in reading, but this was not found for the second year of the study. Girls and boys were called on equally for all other subjects.

3. Teachers responded to student behavior rather than student sex; similar behavior exhibited by both boys and girls received similar responses.

4. Students attended to the sex of other students, initating interaction with and responding to same-sex classmates more appropriately and more frequently than to cross-sex classmates.

In Chapter Four, we showed that classroom observations provided little behavioral evidence to explain the students' overwhelming preference for same-sex interactions. That is:

1. Although different, cross-sex interaction was not consistently less agreeable than same-sex interaction, and

2. Teachers were not more likely to sanction cross-sex interaction than same-sex interaction.

Student attitudes regarding cross-sex interaction were consistently negative, as were ratings of cross-sex classmates. Although correlations between attitudes and behaviors were statistically significant, behavior was not associated with gender stereotypes, suggesting a normative rather than general antipathy.

In Chapter Five, we found that boys reported having more leadership experiences and were more influential than the girls in their classrooms. The only indicator that did not show greater male leadership was our direct observation of academic leadership.

In Chapter Six, we reported the findings of our analysis of the intervention implementation and its effects. From both observation and student report it was evident that the intervention efforts had statistically significant effects on changing the amount of leadership and group collaboration that students--particularly fifth-grade students--in the experimental classrooms experienced. The overall level of these experiences was quite low, however. Few students reported experiencing any leadership or group collaboration in any classrooms, and the observation records support their reports. Major effects were found, moreover, for students in fifth-grade experimental classrooms, or approximately one-quarter of the students.

The effects of the intervention, as indicated by an analysis of classroom means, appear to be mixed. These results are summarized as follows:

1. The intervention was not successful in changing cross-sex ratings of classmates. Although there was some movement in the desired direction in the experimental classrooms, the differences between same-sex and cross-sex ratings remained large in both experimental and control classrooms.

2. Observed cross-sex interaction in the experimental classrooms was more frequent than in the control classrooms; this difference was statistically significant.

3. Sex differences in influence, observed at the pretest, were not evident at the posttest, but no sex by experimental condition interaction was found for either the pretest or the posttest, suggesting that the experimental condition was not responsible for this change in influence.

4. The experimental treatment was successful in improving boys' attitudes towards cooperating with girls, but had no effect on any other student attitude or self perception.

How can we explain these findings? On the one hand, they are consistent with the reports of others: the boys are more disruptive in the classroom than the girls are, hence--on the average--they may receive more teacher attention. On the other hand, there is nothing in our data to suggest that teachers are responding to boys as boys; rather, they respond virtually entirely to the nature of the student behavior. It is, perhaps, puzzling that teachers do not treat boys differently than girls, since the boys treat the teachers so differently.

As Goodlad (1984) has shown, and our data confirm, teachers enagage in a variety of activities in the classroom, not all of which entail a direct interaction with the student. In our fourth- and fifth-grade classrooms, teachers only responded to student behavior about 20% of the time; the rest of the time the teacher ignored the student. The teacher must choose, therefore, what to respond to, and our data suggest that the choices were sensible and appropriate: instruct inappropriate or neutral academic performance, reward appropriate academic performance, manage inappropriate behavior generally, and ignore the rest.

Although students responded more frequently--about 25% of the time--to the other students than did the teachers, their cross-sex responses--while different--were not substantially less positive than their same-sex ones. In fact, same-sex interactions may have been less agreeable than cross-sex interactions, particularly for boys.

Yet the students uniformly report preferring to work with other students of their own sex. That is, student sex--which is apparently unrelated to teacher behavior and only somewhat related to student behavior--is of paramount importance to student self reports. In our earlier work, we observed that organizing students into cross-sex groups was frequently met with much vocal resistance on the part of students. It was apparently important for each student to inform all other members of the class that he or she was not in favor of cross-sex work groups. When the teacher made it perfectly clear that cross-sex work groups were to be the norm of the class, however, the students stopped complaining and settled down to work. A norm had been established and the students were willing to conform to it.

This norm, or course, did not universally apply to all settings. Work settings and recreational settings frequently evoke different normative standards. Schofield's studies of integrated junior high schools provide ample evidence that integrated classrooms do not uniformly result in integrated lunchrooms. We found some evidence for the situational relevance of norms in the interviews we held with the

experimental teachers at the end of Year 2. One teacher explained how she had discussed with her students that "life" required one to work with lots of different types of people and that she would expect her students to "sit like life" in the classroom: boys and girls sitting with and next to each other. The children readily accepted this new norm and grouped themselves appropriately. When it came time for a field trip in a school bus, however, the children tested the new norm by asking, "Do we have to 'sit like life' on the bus?" The teacher allowed that since the trip was recreation and not work she would not require them to "sit like life."

In a sense, this is what the entire study showed. Sex segregation and male preeminance were found uniformly in the school classrooms we observed. Even if they were not created there by the behavior of teachers or students, they were not reduced there, either. Rather, the classrooms served as environments in which these two inequities could flourish unbounded and without restraint. The structures of the larger society were reproduced without active agents of reproduction other than the children, themselves.

References

Allen, V. (1976). Children as teachers. New York: Academic Press.

Baron, J. N., & Bielby, W. T. (1983, August). Organizational barriers to gender equality: Sex segregation of jobs and opportunities. Paper presented at American Sociological Association, Detroit, MI.

Berk, L. E., & Lewis, N. G. (1977). Sex role and social behavior in four school environments. Elementary School Journal, 3, 205-217.

Best, R. (1983). We've all got scars: What boys and girls learn in elementary schools. Bloomington, IN: Indiana University Press.

Bourdieu, P., & Passerson, J. C. (1977). Reproduction in education, society and culture. London: Sage Publications.

Brophy, J. E. (1981). Teacher praise: A functional analysis. Review of Educational Research, 51, 5-32.

Brophy, J. E. (in press). Interactions of male and female students and female teachers. In L. C. Wilkinson & C. B. Marrett (Eds,) Gender related differences in the classroom. New York: Academic Press.

Brophy, J., Evertson, C., Anderson, L., Baum, M., & Crawford, J. (1981). Student characteristics and teaching. New York: Longman.

Brophy, J. E., & Good, T. L. (1970). Teachers' communication of differential expectations for children's classroom performance: Some behavioral data. Journal of Educational Psychology, 61,(5), 365-374.

Broverman, I. K., Vogel, S. R., Broverman, D. M., Clarkson, F. E., Rosenkrantz, P. S. (1972). Sex role stereotypes: A current appraisal. Journal of Social Issues, 28(2), 59-78.

Campbell, P. B. (1980, April). Student interaction: The importance of race and sex. Paper presented at the Annual Meeting of the American Educational Research Association, Boston, MA.

Cohen, E. G., & Anthony, B. (1982, March). Expectation states theory and classroom learning. Paper presented at the American Educational Research Association Annual Meeting.

Damico, S. B. (1975). Sexual differences in the responses of elementary pupils to their classroom. Psychology in the Schools. 2(4), 462-467.

Delefes, P., & Jackson, B. (1972). Teacher-pupil interaction as a function of location in the classroom. Psychology in the Schools, 9(2), 119-123.

Devries, D. L., & Edwards, K. J. (1974). Student teams and learning games: Their effects on cross-race and cross-sex interaction. Journal of Educational Psychology, 66, 741-749.

DeVries, D. L., & Edwards, K. J. (1973). Learning games and student teams: Their effects on classroom process. American Educational Research Journal, 10, 407-418.

Dweck, C. S., Davidson, W., Nelson, S., & Enna, B. (1978). Sex differences in learned helplessness: I. The contingencies of evaluative feedback in the classroom and II. An experimental analysis. Developmental Psychology. 14(3), 268-276.

Eagly, A. H., & Carli, L. L. (1981). Sex of researchers and sex-typed communications as determinants of sex differences in influenceabilty: A meta-analysis of social influence studies. Psychological Bulletin, 90, 1-20.

Etaugh, C., & Harlow, H. (1975). Behaviors of male and female teachers as related to behaviors and attitudes of elementary school children. The Journal of Genetic Psychology, 127, 163-170.

Fagot, V. I. (1977). Consequences of moderate cross-gender behavior in preschool children. Child Development, 48, 902-907.

Goodlad, J. I. (1984). A place called school: Prospects for the future. New York: McGraw Hill Book Company.

Grant, L. (1982, March). Sex roles and statuses in peer interactions in elementary schools. Paper prepared for the American Educational Research Association meeting, New York.

Guttentag, M., & Bray, H. (1975). Undoing sex stereotypes: Research and resources for educators. New York: McGraw Hill Book Company.

Hallinan, M. T. (1977). The evolution of children's friendship cliques. Chicago: Spencer Foundation. (ERIC Document Reproduction Service #ED 161 556)

Hallinan, M. T., & Tuma, N. B. (1978). Classroom effects on change in children's friendships. Sociology of Education, 51, 170-182.

Hansell, S. (1982, July). Cooperative group learning and the racial and sexual integration of peer friendships. Paper presented at the Second International Conference on Cooperation in Education at Brigham Young University, Provo, UT.

Jackson, P. (1968). Life in classrooms. New York: Holt, Rinehart & Winston.

Kahne, H., & Kohen, A. I. (1975). Economic perspectives on the roles of women in the American economy. Journal of Economic Literature, 13(4), 1249-1292.

Leinhardt, G., Seewald, A. M., & Engel, M. (1979). Learning what's taught: Sex differences in instruction. Journal of Educational Psychology, 71(4), 432-439.

Lockheed, M.E. (in progress). Sex and social influence in mixed sex classroom groups. Princeton, NJ: Educational Testing Service.

Lockheed, M. E. (in press). Sex and social influence: A meta-analysis guided by theory. In J. Berger & M. Zelditch (Eds.), Status, attributions and rewards. San Francisco: Jossey Bass.

Lockheed, M. E. (1984). Sex segregation and male preeminance. In E. Fennema & M. J. Ayer (Eds.), Women and education. Berkeley, CA: McCutchan Publishing.

Lockheed, M. E., Finkelstein, K. J., & Harris, A. M. (1979a). Curriculum and research for equity: A training manual for promoting sex equity in the classroom. Princeton, NJ: Educational Testing Service.

Lockheed, M. E., Finkelstein, K. J., & Harris, A. M. (1979b). Curriculum and research for equity: Model data package. Princeton, NJ: Educational Testing Service.

Lockheed, M. E., & Hall, K. P. (1976). Conceptualizing sex as a status characteristic: Application to leadership training strategies. Journal of Social Issues, 32(3), 111-124.

Lockheed, M. E., & Harris, A. M. (1984). Cross sex collaborative learning in elementary classrooms. American Educational Research Journal, 21, 275-294.

Lockheed, M. E., & Harris, A. M. (1982). Classroom interaction and opportunities for cross-sex peer learning in science. Journal of Early Adolescence, 2(2), 135-143.

Lockheed, M. E., Harris, A. M., & Nemceff, W. P. (1983). Sex and social influence: Does sex function as a status characteristic in mixed-sex groups of children? Journal of Educational Psychology, 75(6), 877-888.

Marquis, A., & Cooper, C. R. (1982). Process and outcomes of peer interaction. Paper presented at the Second International Conference on Cooperation in Education, Provo, Utah.

Meyer, W., & Lindstrom, D. (1969). The distribution of teacher approval and disapproval of Headstart children (final report). Washington, DC: Office of Economic Opportunity.

Meyer, M., & Thompson, G. (1956). Teacher interactions with boys as contrasted with girls. In R. G. Kuhler & G. G. Thompson (Eds.), Psychological studies of human development. New York: Appleton-Century-Crofts.

Pottker, J., & Fishel, A. (Eds.). (1977). Sex bias in schools: The research evidence. Cranbury, NJ: Fairleigh Dickinson University, University Press.

Pugh, M. D., & Wahrman, R. (1983). Neutralizing sexism in mixed-sex groups: Do women have to be better than men? American Journal of Sociology, 88(4), 746-762.

Raviv, S. (1982). The effects of three teaching methods on the cross-sex cooperative and competitive behaviors of students in ethnically-mixed seventh grade classes. Paper presented at the Second International Conference on Cooperation in Education, Provo, UT.

Riordan, C. A. (1983). Sex as a general status characteristic. Social Psychology Quarterly, 46(3), 213-219.

Schofield, J. W., Sagar, H. A. (1977). Peer interaction patterns in an integrated middle school. Sociometry, 40(2), 130-138.

Sharan, S., & Hertz-Lazarowitz, R. (1979). A group investigation method of cooperative learning in the classroom. In S. Sharan, P. Hare, C. D. Webb, & R. Mertz-Lazarowitz (Eds.), Cooperation in Education. Provo, UT: Brigham Young University Press.

Singleton, L. C., & Asher, S. R. (1977). Peer preferences and social interaction among third-grade children in an integrated school district. Journal of Educational Psychology. 69(4), 330-336.

Spaulding, B. L. (1963). Achievement, creativity, and self-concept correlates of teacher-pupil transactions in elementary schools (Cooperative Research Project No. 1352). Washington, DC: DHEW, Office of Education.

Serbin, L. A., Tonick, I. J., & Sternglanz, S. H. (1977). Shaping cooperative cross-sex play. Child Development. 48, 924-929.

Webb, N. (1982). Powerful predictors of achievement in cooperative small groups. Paper presented at the Annual Meeting of the American Educational Research Association, New York.

Webb, N. M., & Kenderski, C. M. (in press). Gender differences in small group interaction and achievement in high achieving and low achieving classrooms. In L. C. Wilkinson & C. B. Marrett (Eds.), Gender related differences in the classroom. New York: Academic Press.

Webster, M., & Driscoll, J. E., Jr. (1978). Status generalization. American Sociological Review, 43, 220-237.

Webster, M., Jr., & Entwisle, D. R. (1974). Raising children's expectations for their own performance: A classroom application. In J. Berger, L. Conner & M. H. Fisek (Eds.), Expectation states theory: A theoretical research program. Cambridge, MA: Winthrop Publishers.

Wilkinson, L. C., Chiang, C. P. & Lindow, J. (in press). Sex differences and sex segregation in students' small groups communications. In L. C. Wilkinson & C. B. Marrett (Eds.), Gender related differences in the classroom. New York: Academic Press.

Wilkinson, L. C., & Subkoviak, M. (1982). Sex differences in classroom communication. Paper presented at the International Interdisciplinary Congress on Women, Haifa, Israel.

Appendix A

Project Publications and Presentations

Publications

Lockheed, M. E. (in press). Some determinants and consequences of sex segregation in the classroom. In L. C. Wilkinson & C. B. Marrett (Eds.), Gender related differences in the classroom. New York: Academic Press.

Lockheed, M. E. (in press). Sex equity in classroom organization and climate. In S. S. Klein (Ed.), Achieving sex equity through education. Baltimore, MD: Johns Hopkins University Press.

Lockheed, M. E. (1984). Sex segregation and male preeminance in elementary classrooms. In E. Fennema and J. Ayer (Eds.), Women in Education. Berkeley, CA: McCutchan Publishing Company.

Lockheed, M. E., & Harris, A. M. (1984). Cross-sex cooperative learning in elementary classrooms. American Educational Research Journal, 21, 275-294.

Lockheed, M. E., & Harris, A. M. (1982). Classroom interaction and opportunities for cross-sex peer learning in science. Journal of Early Adolescence, 2(2), 135-143.

Presentations

Lockheed, M. E., & Harris, A. M. (1983, September). Social psychological effects of cross-sex interaction in school classrooms. Paper presented at the Annual Meeting of the American Sociological Association, Detroit, MI.

Lockheed, M.E. (1983, August). Peer sexism in elementary classrooms. Paper presented at the Annual Meeting of the American Psychological Association, Annaheim, CA.

Lockheed, M. E. (1983, April). Evaluating real effects on student behavior: Triangulation of data. Paper presented at the Annual Meeting of the American Educational Reserch Association, Montreal.

Lockheed, M. E., Harris, A. M., Amarel, M., Finkelstein, K. J., & Nemceff, W. P. (1983, April). Sex differences in peer interaction: Effects on student self perceptions and gender stereotypes. Paper presented at the Annual Meeting of the American Educational Research Association, Montreal.

Lockheed, M. E. (1982, July). Opportunities for collabortive cross-sex learning in elementary school. Paper presented at the Second International Conference of the International Association for the Study of Cooperation in Education, Provo, UT.

Lockheed, M. E. (1982, June). Sex equity in classroom interaction. Paper presented at the Annual Meeting of the National Women's Studies Association, Arcata, CA.

Lockheed, M. E. (1982, March). Sex equity in classroom interaction research: An analysis of behavior chains. Paper presented at the Annual Meeting of the American Educational Research Association, New York.

Lockheed, M. E., & Harris, A. M. (1982, March). Classroom interaction and gender differences in opportunities for peer learning in science. Paper presented at the Annual Meeting of the American Educational Research Association, New York.

Harris, A. M., & Lockheed, M. E. (1982, March). Individual and group scientific problem solving performance for boys and girls. Paper presented at the Annual Meeting of the American Educational Research Association, New York.

Lockheed, M. E. (1931, October). Gender effects on opportunities for peer learning in science. Paper presented at the Seventh Annual AERA/SIG:RWE Reserch Conference on Women in Education, Washingtcn, DC.